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AUTHOR Voelker, Alan M.; And Others
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ABSTRACT

This annotated bibliography was compiled from over 50 different sources. The specific purpose of the annotation project was to locate recent studies which might give direction to future research and help verify basic assumptions. The annotations have been divided into two sections, environmental education and environmental communications. The environmental education studies have been grouped into seven related categories: (1) curriculum organization; (2) instructional strategies; (3) acquisition of knowledge, attitudes, and behaviors; (4) program development and evaluation; (5) resources and facilities; (6) outdoor recreation; and (7) environmental perception. The environmental communications have been grouped as follows: research approaches and methods; case studies related to decision-making in environmental situations; and the possession of knowledge, attitudes, and behaviors by the general public. Each annotation lists the author's name, title of the article, the source, page number, date, and a brief description of the content. (Author/TK)

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Environmental Education--Related Research, 1969-72
An Annotated Bibliography

by

Alan M. Voelker
Northern Illinois University
DeKalb, Illinois

and

Fred A. Heal
Saskatchewan Department
of the Environment
Regina, Saskatchewan

Robert E. Horvat
State University College
at Buffalo
Buffalo, New York

CENTER FOR ENVIRONMENTAL COMMUNICATIONS AND EDUCATION STUDIES
University of Wisconsin—Madison
433 N. Murray Street

SE 018 871

UNIVERSITY OF WISCONSIN-MADISON

CENTER FOR ENVIRONMENTAL
COMMUNICATIONS AND EDUCATION STUDIES

Schools of Natural Resources •
Education • Journalism and
Mass Communication
~~602 State Street~~ 433 N. Murray St.
Madison, Wisconsin 53706

FOREWORD

The investigators at the growing edge of research in environmental education and environmental communications have had difficulty in locating relevant studies, because the terms are new to the lexicon, research efforts have been dispersed in time and space, and resulting reports have appeared in a wide array of journals.

This annotated bibliography attempts to bring improved order to the situation. While undoubtedly some pertinent references have been overlooked and some that are included may be peripheral, the net end product constitutes a valuable contribution to the literature which this Center is proud to sponsor.

Clay Schoenfeld.

Prof. CLARENCE A. SCHOENFELD
Chairman

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INTRODUCTION

As environmental education seeks its focus as a scholarly endeavor, pertinent literature and research information is scattered across many sources. This is typical in any new field, but it is particularly characteristic of EE because of its interdisciplinary and multi-disciplinary focus. Also, environmental education involves the interaction and the integration of cognitive and affective educational domains.

Researchers from the many disciplines related to environmental education and environmental communications have the potential to contribute to EE's research base. For environmental education is directed at all citizens whether they are participating in formal schooling or receiving an education through one of several non-school endeavors, and both the pre-schooler and the octogenarian. Research implications for environmental education and environmental communications come from engineering studies of water pollution as well as psychological studies of the effects on humans of the man-made environment. Thus locating and consolidating the research base for environmental education can be a formidable task.

It is necessary to identify which scholars are reporting research results of use to environmental educators and communicators and to find where they report these results, not only to become aware of available new information but also to emphasize the fact that, even though the title and the initial structure may be new, the research base and inputs of value to environmental educators are not.

When a new field develops, it is necessary to locate previous research which can be used to refine definitions and verify underlying assumptions in the area. Such research input would refer to characteristics, content and goals as well as the philosophical underpinnings which initially gave rise to the postulated structure. This is particularly critical to an area such as environmental education because it has a <u>total community</u> perspective. Therefore, one would anticipate and even expect that usable research input would come from the total research community.

Environmental education has now reached the state where it is mandatory that this research be sought out, consolidated, and utilized in decision-making. We have been allowed the usual grace period to share the rhetoric, but we are at that point in time when rhetoric and opinion must be substantiated by consolidating existing research efforts and focusing future efforts. The credibility of environmental education will come only when this has been accomplished. Our initial first judgments about goals of environmental education, people's perceptions of their environment and the like, have been used effectively to get things rolling, but we must now be about the business of validating the assumptions and utilizing a research base if EE is to continue to advance. This was the general purpose underlying the project which produced this annotated bibliography.

This annotated bibliography project is one of several activities devoted to the acquisition, assembly, and interpretation of pertinent research. These include:

1. Roth, Robert E. and Stanley L. Helgeson. <u>A Review of Research Related to Environmental Education</u>, Research Review Series - Environmental Education Paper 1, ERIC Information Analysis Center for Science, Mathematics and Environmental Education, The Ohio State University, Columbus, Ohio, September, 1972.

2. Swan, Malcolm, Donald Hammerman, and William Stark. Some Dissertations in Environmental, Conservation, and Outdoor Education. A publication of the Department of Outdoor Teacher Education at Northern Illinois University at Taft Campus, Oregon, Illinois, 1973.

3. Voelker, Alan M. and Michael D. Watson. The Status of the Research Base for Environmental Education, Working Paper No. 86, Wisconsin Research and Development Center for Cognitive Learning, Madison, Wisconsin, (In Press).

Roth and Helgeson provide some insight into the research effort which preceded more recent conceptualizations of environmental education and the Outdoor Teacher Education staff at Northern Illinois has compiled a list of related doctoral dissertations. Voelker and Watson have identified and classified over 600 publications with direct and supportive connection to environmental education and present a brief overview of trends and patterns of research in today's EE. The unique contribution of this annotated bibliography is that it provides specific information about current studies reported during a defined time period.

The specific purpose of the annotation project was to locate recent studies which might give direction to future research and help verify basic assumptions. Such a compilation would shed light on the nature of current R & D activity. It would indicate what aspects of environmental education are research based, and give us insight into what conceptual and structural organizations might be fruitful directions to follow. And, of course, there would be indications as to what program orientations had been successful or unsuccessful in furthering the desired goals of environmental education.

The basic procedure was to search a variety of literature published during January 1969-June 1972. Environmental education has been in a formative stage just prior to and during that period, and, as a result, pertinent literature might be found in a variety of publications from the sciences, social sciences, and humanities. Also, because of this formative nature, some pertinent research activity may not have been published in the more prestigious journals.

The search was designed to coincide with a specific date, the inception of the Journal of Environmental Education. The first issue of JEE was issued early in 1969. That issue and subsequent issues should reflect the thinking which gave rise to environmental education. Thus, studies completed and published in the period starting with January 1969, should be those based on the new, expanded conceptualizations of environmental education, those conducted with the intent of providing focus to this new scholarly area. These studies should be some of the more informative ones in terms of sharpening the thrust of environmental education.

Both refereed and non-refereed journals were searched because we were interested in who was thinking and writing about needed research as well as highly sophisticated empirical research. The search procedure involved approximately 50 journals and periodicals. In addition to periodic literature, a comprehensive search was made of "Dissertation Abstracts," a variety of local materials, and solicitations of isolated research pieces obtained through personal contacts. Other sources of information about environmental education and communications research came from reports such as those referred to earlier.

There is much value during the formative stage of an area in looking at surveys and less sophisticated studies. These can provide sound conceptual ideas and insights into means of attempting to verify assumptions. And, in addition, when there are so many people from so many areas entering the arena, it is very difficult to judge who, in fact, is the "expert".

The series of annotations presented in this bibliography is representative of the research being done in environmental education and environmental communications for the specific time period. Some studies are of higher quality than others, but each, in its own way makes a contribution suggesting directions for research or adding to verification of some a priori assumptions.

For the user's convenience, the annotations have been divided into those related to environmental education, (primarily related to elementary and secondary school programs), and environmental communications. The environmental education studies have been empirically grouped on the basis of what was found, producing a total of seven related categories of environmental education research. These include curriculum organization--philosophy, goals, and objectives; instructional strategies; acquisition of knowledge, attitudes and behaviors; program development and evaluation; resources and facilities; outdoor recreation; and environmental perception. The environmental communications studies have been grouped according to a structure proposed by John Ross in his article,* "Azimuths in Environmental Communications Research." These studies deal with research approaches or methodologies, case studies related to decision-making in environmental situations, and the possession of knowledge, attitudes, and behaviors by the general public.

It is anticipated that this report and updates of it might be of value to both EE researchers and program developers.

*See section B of this report, p. 33 , for a complete reference.

BIBLIOGRAPHY

A. Environmental Education -- Research Needs

The articles cited here are not reports of actual research studies. However, the authors speak to problems and issues in environmental education whose analysis can give rise to identification of pertinent research areas and subsequent researchable problems. Those researchers who wish to insure that their efforts are focused on key aspects of environmental education would be well advised to give the substance of these articles careful and repeated scrutiny.

Ashbaugh, Byron L., "Interpretive Research Directions," Journal of Environmental Education, 1(3):77, Spring, 1970.

Donaldson, George W., "Research in Outdoor Education," Journal of Environmental Education, 3(4):9-10, Summer, 1972.

Hendee, John C., "Challenging the Folklore of Education," Journal of Environmental Education, 3(3):19-23, Spring, 1972.

Justice, Ernest, "Environmental Dimensions of Aesthetic Education," Journal of Environmental Education, 3(4):30-35, Summer, 1972.

Knapp, Clifford E., "Attitudes and Values in Environmental Education," Journal of Environmental Education, 3(4):26-29, Summer, 1972.

Naylon, Michael J., "Needed a 'Real World' Program of Environmental Education," The American Biology Teacher, 32(7):404-409, 1970.

Schoenfeld, Clay, "Toward a National Strategy For Environmental Education," Journal of Educational Research, 64(1):5-11, 1970.

Stapp, William B., "The Concept of Environmental Education," Journal of Environmental Education, 1(1):30-31, Fall, 1969.

A-1. Curriculum Organization -- Philosophy, Goals, and Objectives

The focus of these research reports ranges from broad program considerations to the identification of specific content for inclusion in a given curriculum.

Brunckhorst, William Louis, "The Development of a Theoretical Model Based on the Six Realms of Meaning for the Purpose of Developing an Interdisciplinary Environmental Studies Program," Dissertation Abstracts, 32(7):3856-A, 1972.

The purpose of this study is the development of a theoretical model which may aid curricular construction in the area of environmental studies. The model constructed purports to show interrelationships among six realms of meaning, a curricular theory for general education as proposed by Philip H. Phenix, and used as a base for this model. These realms of meaning were placed by Phenix in a spectrum of meaning ranging from symbolics to synoptics with the realms of empirics, esthetics, synnoetics, and ethics between them.

Conclusions of the study include:

1. Sufficient overlap seems to exist among the six realms of meaning to produce a truly interdisciplinary environmental studies curriculum, and such a curriculum should be constructed from the subject matter of the disciplines in all realms.

2. It is essential that man's feelings (a sense of ethics) be extended, from the individual or the society of which he is a part, to include the biotic and physical environment upon which he depends, and if necessary, this can be done ecologically as well as philosophically.

Cauley, Michael John, "Industrial Arts and Environmental Education: Environmental Concepts Judged Applicable to Industrial Arts Teaching Areas by Industrial Arts Teacher Educators," Dissertation Abstracts, 32(10):5583-A, 1971.

The purpose of this study was to identify which environmental education concepts should be taught in industrial arts as a subject matter area and more specifically which environmental concepts should be taught in the various teaching areas within the traditional industrial arts programs. A list of environmental concepts originally prepared by Robert Earl Roth formed the basis for this study. This list of concepts numbering 111 was sent to a jury of 7 qualified persons in the area of industrial arts. These jury members were asked to select those of the 111 concepts to which industrial arts could make the greatest contribution. A narrowed list of concepts resulted. The narrowed list was then sent to an identified population of industrial arts teacher educators. This population was asked to categorize each of the environmental concepts in the narrowed list of 53 into one of three possibilities: applicable to my teaching area; applicable to industrial arts, but not to my teaching area; or not applicable to industrial arts. All of the environmental concepts were considered applicable to the industrial arts teaching areas at the 66% level of agreement except one. More specifically it was found that the industrial arts teacher educators could identify which environmental concepts should be taught in the various identified teaching areas in industrial arts. For example:

1. Metals--Minerals are nonrenewable resources.
2. Plastics-crafts--Pollutants and contaminants are produced by natural and man-made processes.
3. Graphic arts--Water is a reusable and transient resource, but the available quantity may be reduced or quality impaired.
4. Drafting--Man has ability to manipulate and change the environment.
5. Power--The nonrenewable resource base is considered finite.
6. Woods--Natural resources are interdependent and the use or misuse of one will affect others.

It can be concluded that there is a concrete relationship between industrial arts and environmental education. A second conclusion is that the concepts used in this study should be included in the traditional industrial arts teacher educator programs and would be best suited to the total subject area of industrial arts.

Dorsey, Albert H. H., "A survey Study of the Comparative Status of Understanding and Reasoning in Conservation Concepts by Ninth Grade Students in the Public Schools of South Carolina," Dissertation Abstracts, 33(2):549-A, 1972.

The problem under consideration in this study was to determine the status of understanding and reasoning in conservation concepts and principles as demonstrated by ninth-grade students in the public schools of South Carolina. Forty-eight schools were chosen which would allow for comparisons of schools from three locations--urban, suburban, and rural; two school sizes--over 650 enrollment and under 650 enrollment; and two conditions of race predominance in enrollment--predominantly black (over 50%) and predominantly white. In addition a comparison was made between sexes by testing twenty male students and twenty female students in each school. After schools were selected, the "Test of Reasoning in Conservation" was administered in both forms A and B to both male and female subjects in all 48 schools. Results indicated no significant differences between urban and suburban schools, but both urban and suburban scored significantly higher than rural. With few exceptions, large schools scored slightly higher than small schools; subjects from predominantly black schools scored lower than subjects from white schools. Other results are reported.

Fitzpatrick, Clinton N., "Philosophy and Goals for Outdoor Education," Journal of Outdoor Education, 4(2):17-21, 1970.

Fitzpatrick develops a philosophy for outdoor education by synthesizing ideas of educational leaders and philosophies. He then identifies nine goals consistent with the philosophy. These statements received a majority approval from three panels of experts: outdoor education specialists, professionals in education and other disciplines, and superintendents in school districts with outdoor education programs. The hypothesis of close agreement on goals among outdoor educators was supported. A research critique by Morris Wiener is included.

Henson, Kenneth T., "Principles of Conservation of Clean Air and Water Pertinent to the General Education Programs in Junior High Schools," School Science and Mathematics, 72:17-26, 1972.

The study identified 42 principles of air pollution and 47 of water pollution important to understanding natural purification processes. Of these, 37 air pollution and 42 water pollution understandings were deemed appropriate at the junior high level by two junior high teachers. Using these listings, Henson lists over 40 "specific appropriate behaviors" to conserve clean air and water.

Horn, B. Ray, "A Factor Analysis of Attitudes Toward the Term 'Outdoor Education'," Journal of Outdoor Education, 3(3):15-17, 1969.

The article focuses on similarities and differences in attitudes towards the term "outdoor education." An instrument was given to college and university members of the American Association for Health, Physical Education and Recreation's Council on Outdoor Education and Camping. Results indicated three overlapping orientations to "outdoor education." A factor analysis and interpretation identified the three groups: (1) environment-oriented, (2) conservation-oriented, and (3) outdoor-activity-oriented.

Janke, R. L., & Tella, M. O., "Earth Science Concept List for Grades K-12 Curriculum Construction and Evaluation," Journal of Research in Science Teaching, 9(3):223-230, 1972.

Earth Science concepts recommended by professionals in the field for inclusion in the K-12 science curriculum were identified. Three panels of earth scientists assisted, with the third representing a statistical sampling of the membership of five different professional organizations related to earth science. A final approved list of 52 concepts was produced. Janke asserts that a majority of the most important earth science concepts for the K-12 program appear on the list.

Johnson, Shephard Sterling, "Ethics and Ecology in the Conservation Movement in the United States of America," Dissertation Abstracts, 31(5):2484-A, 1970.

The purpose of this dissertation is to trace the role of ecology and Christian social ethics in the conservation movement in the United States of America and to demonstrate that the conservation of natural resources is primarily an ethical question. The hypothesis defended is that man's relationship to nature goes beyond science and economics to ethics, especially Christian social ethics. It raises questions of values and priorities. It involves the concept of man's stewardship of the earth, his appreciation of the gift of life, and his responsibility to his fellow man and to future generations. The method of approach is both historical and normative. The study concludes that the conservation movement had deep ethical roots. Its argument against waste and extravagance, its plea for distributive justice, its concern for the public welfare and its constant reminder of man's obligations to others, are all indications of an ethical issue. In light of this, conservation is defined as man's responsible action toward the natural world that grows out of the recognition of his stewardship and his responsibility to God and fellow man. The ethical dimension of conservation rests on certain key premises: 1) that man is a member of a total world community that demands his respect and 2) that he is responsible for his actions within that community. A conservation ethic changes the role of man from conqueror of the natural world to responsible citizen of it.

Michaud, Howard H. and Hilterbrand, L. R., "Conservation Education in Indiana," Journal of Environmental Education, 3(3):39-43, Spring, 1972.

This study surveyed the amount of environmental conservation being taught in Indiana's secondary schools. A questionnaire sent to 125 principals, (46% response rate) listed conservation topics such as Education, Legislation, and Basic Resources, and respondents were to check those subject matter areas, such as Biology, Social Studies, Agriculture, in which each topic was covered. Conclusions included: agriculture and biology provide the most instruction in natural resource conservation; social studies provide the most instruction in education and human resources; relatively few teachers are trained in natural resources conservation; in the teaching of conservation, most respondents feel occupations should be stressed; most principals feel misuse of resources has been caused by lack of education. The survey indicates school administrators are aware of the need for greater emphasis on environmental conservation.

Modisett, Sandra Ann, "A Pattern of Curricular Experiences in Outdoor Education," Dissertation Abstracts, 32(10):5474-A, 1971.

The primary purpose of this study was to determine a pattern of curricular experiences in outdoor education to be included in undergraduate teacher education for elementary education. The secondary purposes of the study were to determine the status of outdoor education in colleges and universities and the acceptance of outdoor education by Colleges and Schools of Education. Teachers, supervisors, curriculum directors, principals, and college instructors responded to a survey rating experiences they felt should be a part of the undergraduate preparation in elementary education for outdoor education. The experiences were in the categories of experiences that take place on campus, in the city, outside the city and require a day's trip, and from or at a resident outdoor school. The curricular experiences accepted by the teachers were sent to members of two juries for their judgmental rating. The juries were professionals in outdoor education and professionals in curriculum and teacher education. A mean of 4 or better was necessary for a curricular experience to be accepted by the groups participating in the study. The Spearman Coefficient of Rank Correlation was used to analyze the data. Results included:

1. There was a highly dependable relationship between the teachers, curriculum directors, supervisors and principals as to the curricular experiences that should take place in outdoor education.
2. There was only a moderate relationship between the teachers and the college instructors as to the curricular experiences that should be a part of the curriculum.
3. Fewer than half (23 of 64) of the college and universities offered courses in outdoor education. Only one college required such a course.
4. The reasons given for the lack of acceptance of outdoor education in the elementary education curriculum included: crowded schedules, lack of staff and lack of interest.

Ronfeldt, Leo Leonard, "A determination of Basic Urban Environmental Understandings Important for Inclusion in the Elementary School Curriculum," Dissertation Abstracts, 30(9):3649-A, 1970.

It was the purpose of this study to determine those understandings important for inclusion in the elementary school curriculum and basic to the knowledge of the urban environment. A survey instrument was developed based on authoritative books, pamphlets, directed readings on urban affairs, and a personal knowledge of conservation. The survey was then sent to a critic panel of 60 educators in five midwestern states with 10 stratified metropolitan areas, and a nationwide group of 30 conservationists. The total population of the critic panel consisted of 90 members. The survey instrument presented five categories of understandings including air, land use, man-made resources, water, and urban ecology. The survey instrument consisted of 104 understandings. Forty-three understandings or 41.3% of the 104 understandings received a mean value of 4.0 or higher by both groups of the critic panel which indicates the importance of those understandings for inclusion in the elementary school curriculum and basic to the knowledge of the urban environment. Conclusions include:

a. Comments received from the educators and conservationists stressed a need for the inclusion of urban environmental studies in the elementary school curriculum.

b. According to the comments made by the critic panel members, urban environmental education should be incorporated into other disciplines rather than being included as a separate discipline in the school curriculum.

c. The five categories of urban environmental understandings seemed to be judged as equal in importance.

Roth, Robert E., "Fundamental Concepts for Environmental Management Education," Journal of Environmental Education, 1(3):65-74, Spring, 1970.

The purpose of this study was to answer the question "What should our citizens know about environmental management?" A taxonomy of conceptual objectives related to environmental management education K-16, was developed. An initial list was formulated by reviewing relevant literature from major conservation areas and sent to a Wisconsin Panel of Scholars (WPS) who individually critiqued it. A revised list was then formed and returned to WPS members, who again critiqued it. A revised list was developed utilizing the Blanchet scale technique and sent to a 699 member National Panel of Scholars who evaluated the objectives in terms of credibility and degree of acceptability. The 111 statements that met the criterion, "acceptable by 90% of responding panel members (350)" were classified by topic. Scholars are useful in preparing objectives, which can be utilized in curriculum planning. Academic and regional bias of respondents did not influence inclusion of statements. Rejection of selected statements appeared to be due to communication failure.

A-2. Instructional Strategies

The development and evaluation of several possible instructional approaches for use in environmental education programs are included in this section.

Ames, Edward A., "Schools and the Environment," Journal of Environmental Education, 2(3):1-3, Spring, 1971.

The author discusses a teaching method utilizing a child's perceptions of community environmental problems to effect changes in his behavior. The advantages of this new method over more traditional ones are delineated. These include 1) greater student relevancy, 2) social values and behaviors are more likely to be challenged, and 3) children develop the ability to confront issues and effect changes in the social process. Team teaching and the integrated day could utilize this approach to provide children with open-ended exploration of their environment and develop more positive attitudes towards it. Schools with greater community involvement, particularly those in the inner-city, have excellent potential for using this method. Inadequate teacher preparation and organizational abilities, and the basic classroom structure provide the principle barriers. The implication is that students must investigate their society and corresponding systems of values, concerns, and assumptions if environmental behaviors are to be affected.

Carter, Doris Marie, "Visual Environmental Education: The Use of Vision as the Primary Sensory Mode of Perception Employed in the Teaching of the Fundamentals of Environmental Education," Dissertation Abstracts, 33(2):494-A, 1972.

This paper explores the use of vision as the primary mode of perception employed in the teaching of the fundamentals of environmental education. Resource-material for use by the educator in higher education is compiled using ten diversified environmental areas. The data of the ten areas are presented in both verbal and visual forms. This resource-material is presented in a multi-discipline manner; and was compiled for the purpose of clarifying values necessary to understand the interrelatedness among man, nature, his culture, and his bio-physical development in order to enhance the quality of life. The ten diversified environmental areas concerned with visual environmental education that were investigated are The Intimate City, Organic/Inorganic Relations, A Case Study in Environmental Analysis, A Case Study in Visual Space Usage, The Human Habitat as a Spatial Form, Small Urban Spaces, Solving City Problems, The American Artifact, The Visual Environment Expressed Through the Fine Arts, and The Elementary Curriculum: A Guide For the Graduate Student.

Churney, Marie A., "Vacant Lot Ecology: A Laboratory Block for High School Students," Dissertation Abstracts, 32(1):266-A, 1971.

To meet the need for inner-city field and field-based aboratory experiences the author constructed the vacant lot laboratory block, a series of investigations tied together with a discussion of the organisms involved and the ecological roles they play in a vacant city lot. The vacant lot can be any size from the area remaining after the removal of a building to the rinages found around a parking lot. The ecological concepts of succession, community relationships, inter-species population relationsh ps and intra-species population relationships were illustrated in the block. Field and laboratory investigations included: 1) Wild Yeast Culture, 2) Weed Seed Germination, 3) Plant Density, 4) Culture of Soil Algae, 5) Culture of Soil Bacteria, 6) Staining Techniques, 7) Buried-Slide Technique, 8) Culture of Soil Fungi, 9) Culture of Rhizosphere Microorganisms, 10) Culture of Nematode-Trapping Fungi, 11) Use of Berlese and Baermann Funnels, 12) Plant and Insect Collections, 13) pH Readings, 14) Microclimate Temperatures, 15) Antibiotic Production, and 16) Fungal Slide Culture. The block provides numerous opportunities for extensive individual studies.

Franzblau, Michael C., "Solid Waste Recycling - Earth Science in a Real Situation," The Science Teacher, 38(7):26-28, October, 1971.

The author described an alteration in his earth science course to increase student participation in real situations within the school community. Students investigated costs of solid waste disposal in the town of Mamaroneck, N.Y., with the help of 11 participating families and ran a survey on community attitudes toward solid-waste recycling. They gathered data, formulated and tested hypotheses, and drew conclusions. Major findings were: (1) citizens had a desire to separate solid waste in the home; (2) the majority would be in favor of a recycling program; and (3) most would be more likely to vote for a candidate who has a waste-recycling plan. The student report was presented to the town's Conservation Advisory Committee and then to the Town Board. Students were invited to help plan for establishing a municipally managed recycling effort.

Gulick, Myra Ann, "A Study for the Development of Instruction in Visual Environmental Esthetics," Dissertation Abstracts, 31(8):3776-A, 1971.

The purpose of this study was an exploration for the development of instruction in visual environmental esthetics by means of participation in certain visual environmental activities. Sixty students, including sophomores, juniors, and seniors at The University of Michigan, participated in the study. An experimental group of twenty-four students participated in certain visual environmental activities. These students were non-art students preparing to teach all subjects in the elementary school. One control group of twenty-four students, likewise preparing to teach all subjects in the elementary school, did not participate. Another control group of twelve students, art majors, did not participate. The visual environmental activities were conducted during an eight-week period within the regular framework of the course, Art in the Elementary School. The evaluation instrument for this study utilized a judicative statement written by all the students. The instrument listed ten structures in the students' immediate environment and ten slides of various well known structures. The students wrote an esthetic judgment of all the structures and also listed factual information about the structures. The major conclusion is that instruction in visual environmental activities results in significant learning concerning visual environmental acitvities when compared to comparable students who have not had the learning experience.

Herr, Robert Donald, "Effectiveness of a Program of Agriculture in Elementary Schools with Emphases on Safety, Sanitation, and Conservation," Dissertation Abstracts, 33(1):143-A, 1972.

The purpose of this study was to evaluate the effectiveness of a program of agriculture in the elementary schools in terms of change in pupil interest, attitude and knowledge. Efforts were also made to determine which of three teaching methods achieved the greatest improvement in these areas. Twenty-two sixth grade classes were randomly assigned to the four treatment groups. Five hundred and thirty-nine pupils completed the program and were involved in the study. The four treatment groups or teaching methods were: (1) Subject matter specialist using the resource unit; (2) Homeroom teacher using the resource unit; (3) Homeroom teacher using no resource unit; (4) No formal program of any scope. Each of the four groups received a series of three tests prior to and at the conclusion of the program. They were: (1) the Kuder E General Interest Survey; (2) An Attitude Game based on a semantic differential; (3) the Agricultural Science Achievement Test. Each of the groups except the control received one hour of instruction per week according to the prescribed method for the entire 1970-71 school year. The correlated t test was used to determine significant differences and multiple regression with parsimony was used to select covariates for analysis of covariance tests used to determine differences among pupil mean test scores. Findings of the investigation indicated that a program of agriculture does effect significant changes in attitude and knowledge, but not in interest. Sex and farm experience were not important factors in achieving significant results and I.Q. was closely related to achievement but not to interest or attitude. It was found that pupils taught by the subject matter specialist using the resource unit had significantly higher scores in achievement than pupils taught by the homeroom teacher using the resource unit. However, there were no significant differences in their interest and attitude scores. Homeroom teachers using the resource unit had pupils with significantly higher scores in both attitude and achievement

than pupils taught by the homeroom teacher using no resource unit. No significant differences were observed in the area of interest. Pupils taught by the homeroom teacher using no resource unit had significantly higher achievement scores than those pupils receiving no formal program. There were no significant differences in their interest and attitude scores, however.

Leyden, Michael Bernard, "A Laboratory Oriented College Course in Environmental Geology," Dissertation Abstracts, 32(1):269-A, 1971.

The purpose of this study was to design a beginning course in geology which accents the sociological implications inherent in the study of geology and also presents the learner with the opportunity to solve geological problems by using laboratory techniques. A curriculum rationale was designed in which those environmental problems with geological implications are used as an integrating construct to eclectically balance the curriculum building forces of society, knowledge, and the learner. Five conceptual schemes essential to the study of environmental geology were designed by the author, and used as an aid in selection of subject material to be included in the curriculum guide. Because laboratory courses consume so much time, the author asked three science educators and three geologists to rate each of the activities and projects as an efficient use of time (ET), neutral (N), inefficient use of time (IT), or inappropriate for the course (IA).

McNamara, Eugene Stephen, "A Comparison of Learning Behaviors of Eighth and Ninth Grade ESCP Earth Science Students; One Half Experiencing Laboratory Investigations in the Indoor Environment, the Other Half Experiencing Laboratory Investigations in the Outdoor Environment," Dissertation Abstracts, 32(11):6212-A, 1971.

This study was designed to determine whether there were significant differences in overall achievement, critical thinking, preference for the out-of-doors and the individual achievement concepts between the group experiencing the laboratory investigations in the indoor environment and the group experiencing the laboratory investigations in the outdoor environment. The groups were pre-tested with the ESCP Achievement Test - Unit One, the Cornell Critical Thinking Test and the McNamara Indoor-Outdoor Preference Appraisal in September, 1970. The groups were not pre-tested on the Concepts Tests. The indoor group experienced unit one of the ESCP textbook in the indoor environment. The outdoor group experienced all phases of the course except the laboratory investigations in the indoor environment. One half of the groups in each level was randomly assigned to the outdoor environment. Each teacher involved in the study taught in both environments. There was a total of fifteen groups and six teachers. The following conclusions were reached: (1) significant differences between treatments may be present if one evaluates individual concepts rather than overall achievement; (2) learning in the out-of-doors is enhanced if the concepts are directly related to the environment; (3) critical thinking and preference for the out-of-doors were changed favorably as a result of the out-of-doors treatment; and (4) the out-of-doors environment should be considered by curriculum planning especially for the low ability groups, when designing a curriculum.

McNeil, R. J., "Studying the Environment by Mail," Journal of Environmental Education, 3(2):36-40, Winter, 1971.

This article reports an analysis of two correspondence conservation courses offered by Cornell University. "Current Trends in Conservation," a 1965 sequel to "Conservation of Natural Resources," received the majority of its applications as a result of advertising in county and state newsletters of resource-oriented organizations. Bulk mailing generated enough applications to cover costs, but a display at the New York State Fair and paid advertising in a national magazine did not. A statistical survey of the first course found the average participant to be a male high school graduate between 36 and 45, occupationally categorized as professional. The most valuable facet of the course was the development of real communication between the readers and the participants, apparently a contributor to a superior learning experience in natural resources for the layman.

Nowak, Paul F., "An Independent Study Course in Water Resources," Journal of Environmental Education, 1(3):86-87, Spring, 1970.

This study was designed to determine the suitability of offering correspondence courses in environmental conservation. An experimental water resource course was developed to assess public acceptance and effectiveness of method. Course materials constructed consisted of a text and a series of related activities (questions, community surveys and interviews). The program was evaluated by using a personal data sheet, a pre- and post test, and an opinion questionnaire. Findings: 1) the program was considered instructive and well-liked; 2) participants average age was 39 years--82% were college grads, 88% lived near the city; and 3) the participants showed a 44.6% increase in knowledge of water resources, a 35% increase in awareness of local community water resources, and improved ability to identify water resource agencies and organizations. An implication of the study is that correspondence courses are an acceptable part of environmental education programs.

Peters, Richard O., "To Perceive the Urban Environment in Maine," Journal of Environmental Education, 3(2):49-50, Winter, 1971.

This report discusses the Operation EPIC environmental education field trip program in Portland, Maine. During the 1968 school year, 128 junior high students visited 107 different community resource sites in the area, in an attempt to develop student awareness and appreciation of the urban complex. The next year 26 seventh grade students were randomly selected from the grade population of 284 and taken to three different resource sites in the area: a metal-craft company, a commercial printing company, and a beverage bottling company. Results of a systematic two year evaluation, which included factual recall tests and an open-ended questionnaire, show that exposure to community resource sites enhances students' perceptions of the community, helps class learning, encourages student participation in discussions, and shows how education relates to the world of work.

Presnell, Richard William, "The Development of Evaluation of an Audio-Taped Program of Instruction in Learning Concepts of Ecology and Conservation," Dissertation Abstracts, 32(9):4927-A, 1972.

The main purpose of this study was to design, develop, implement, and evaluate a one year environmental education instructional program emphasizing concepts of ecology and conservation, and environmental interpretative skills to serve as pre-field trip instruction for upper elementary school children. A series of ten, twenty-seven minute, sequential, audio-taped lessons were designed, revised, developed, and replicated in three copies. Four lessons comprised an autumn pre-field trip program, three, a winter program, and the final three made up a spring program. Lesson software consisted of: (1) illustrative color slides, (2) bulletin boards with permanently affixed displays of color photographs, diagrams,charts, and/or cartoons, (3) nine paperback nature guide books, and (4) a variety of natural materials and illustrative models. Audio input was via cassette tape recorders. Lessons were attended individually by students. One hundred thirty-eight children experienced lessons, field trips, and five written production tests. Ninety-eight fifth and sixth graders from a suburban school of the same district experienced three of the five tests, and served as a control. The evaluative student tests indicated that many concept, fact and skill learning gains occurred, but analysis using Fisher's t test for significant changes in both correlated and uncorrelated means indicated that few learning gains were significant. Few significant differences in learning gains were found between field experienced and non-experienced students. Although more significant gains were made by fifth graders, all indications are that the program is more appropriate for sixth grade students.

Sharron, Mark M., "The Problems of Environmental Management: A Manual Designed for Group Discussion, Including a Preliminary Program of Evaluation," Dissertation Abstracts, 33(1):138-A, 1972.

The purpose of this project was to prepare a systematically organized and structured discussion manual on the problems of environmental management which could be used as a basis for group discussion by concerned citizens. To achieve this purpose, the first step was to compile an external bibliography of possible sources of material and then determine the ten sections of the manual, each dealing with an important problem of environmental management, for which articles were to be selected. The selection of the articles was made according to the following criteria: Readability; Accuracy and consistency; Reputation of the author; and Timeliness. The ten sections of the manual are An Ecological Overview, Overpopulation, Air Pollution, Water Pollution, The Effects of Pesticides and Chemicals, Nuclear Hazards, Disposal of Solid Wastes, Abuse of Natural Resources, Excessive Noise, and Citizen Action and Education. A preliminary evaluation was made by representatives of ten different organizations concerned either mainly or peripherally with environmental problems. An accompanying letter sent to them listed the criteria used in selecting the articles and excerpts and requested comments on these points. Neither the individual nor the organization is identified by name. The response in terms of the criteria used in selecting the articles and excerpts was overwhelmingly favorable. Nine of the ten representatives endorsed the manual in its present form and nine of the ten would recommend the manual to organizations similar to their own.

Swinerton, E. Nelson, "Environmental Gaming Simulations," Journal of Environmental Education, 3(4):49-52, Summer, 1972.

The author described the use of environmental gaming simulation, role-playing situations "calling for value judgements, interactive decision-making, and actual problem solving," and their advantages in developing environmental attitudes in the classroom. Differences from case studies, supporting educational philosophy, and descriptions of many games are included. Suggestions are provided for evaluating the games as a device for teaching key concepts.

Tanner, Thomas R., "Environmental Sensitivity and the Mass Media," Journal of Environmental Education, 2(4):34-37, Summer, 1971.

The author describes how the collection of magazine and newspaper ads and viewing television shows and commercials can reflect the environmental anomalies and ironies inherent in their structure. These can be used to direct student activities. The collection and sorting of printed ads according to the environmental awareness shown, and student and teacher critiques of TV ads, hunting shows, and travelogues according to ecological criteria can lead to improved student understanding and public sophistication of environmental news. This improved awareness could result in 1) increased attention by newscasters toward pending environmental legislation, 2) the baring of past performance on environmental issues by incumbent or prospective public office holders, and 3) improved environmental issue news coverage.

Vogan, Charlene Lucile, "Criteria for Evaluating Condition Changes Affecting Teacher-Student Relationships in Outdoor Education," Dissertation Abstracts, 31(8):4050-A, 1971.

This study is designed to determine objectives which would foster conditions for positive teacher-student relationships and to establish evaluative criteria for determining the success of meeting the objectives. The study is developed in five steps: reading selected for gaining broad perspective and specific direction; an exploratory study of current practices in outdoor education; a questionnaire to determine specific practices and the interrelationship of activities and organizational patterns in selected existing programs; development of an experimental guide to test the feasibility of the approach; and, the preparation of evaluative criteria for teachers pertaining to conditions for positive change in teacher-student relationships. The schools studied through use of the questionnaire and the experimental guide were ones offering a resident program of at least three nights to grades five and six with the classroom teacher attending with the class. The geographic distribution included eighteen states. The overall results of the study indicated: a lack of emphasis and guidelines designed to further positive development in the field of teacher-student relations; and, a wide range of procedures in planning, organizing, preparing and carrying out the program. The information gathered did show nine points which should be of concern to the classroom teacher.

A-3. Knowledge, Attitudes, and Behaviors

Research reports in this section are concerned with the assessment of changes in environmental knowledge, attitudes, and behaviors occurring from participation in environmental education programs.

Aronstein, Laurence William, "A Study of Attitudinal Changes in College Students As A Result of Constructive Participation in an Environmental Community Service Project," Dissertation Abstracts, 33(3):1068-A, 1972.

The purpose of this study was to find out what happens to college students who get involved in a community service project dealing with the environmental problem of Solid Waste collection for re-cycling. Two classes of twenty-four students were registered for Environmental Pollution, a three credit course designed for general-liberal students, during the Fall 1971 semester at the State University College at Buffalo. One section was informed that participation in a community service project was a mandatory course requirement. The other was informed that community service project participation was optional and that they would have the choice of writing a term paper or participating in the project. Fourteen students were recruited through Independent Study through which they would receive three credits, and twelve students volunteered for work on the project on a non-credit basis. Student attitudes towards setting up a solid waste redemption center at a storefront location in the Buffalo Core Area were then surveyed through the administration of "The Purdue Master Attitude Scales: A Scale for Measuring Attitudes Toward Any Proposed Social Action." Student attitudes towards their powerlessness (defined as: low expectancies for control of events in the larger society) was surveyed through the administration of "The Powerlessness Scale." "Time Logs" were distributed to the group for the logging of the amount of time spent on all constructive work on the project. "Log Outline" was distributed to the Group for the entering of personal observations. Post tests were administered for "The Purdue Master Attitudes Scales" and "The Powerlessness Scale." Interviews were conducted individually with thirty-two students. Findings:

1. The data identified that the community service project could bring about attitudinal changes in participating students in the following areas: Students do self-perceive positive over-all attitudinal changes in themselves; Students do experience positive attitudinal changes towards the community in which they work and the leaders of that community, provided that the student's exposure to the community and its leaders is not limited; Students are already optimistic about societal change--the community service project reinforces those students who were initially optimistic and does change the attitudes of those previously non-optimistic to a more positive level; and Students grow to prefer outside teaching-learning experiences as a result of their experiences in community service projects.
2. Volunteers gaining credit through Independent Study rank #1 in relation to the amount of constructive time rendered in service and as a group proved to be significantly more constructive than the other recruitment groupings. Volunteers whose participation was optional and Involuntary students ranked #2 and #3 respectively, yet there was little difference between them as groups in terms of time input. The Non-credit volunteers put in significantly less time than all other groupings as a group and ranked #4.

3. As a result of participation, almost all students expressed future willingness to participate in community action projects.

4. "Outside of school" teaching-learning environments are more preferable in terms of student perception as a result of their community service project experience than "inside of school" environments.

Boone, Janice Rae, "Simulations, Concern Level, Grade Level and Sex as Factors Influencing the Assignment of Importance to Environmental Concepts," Dissertation Abstracts, 33(3):951-A, 1972.

This research was intended to examine whether or not treatment, sex, grade level, environmental concern level, and the interactions of these variables were important factors in the assignment of importance to environmental concept statements. In addition, the study was intended to determine whether or not the pattern of responses of junior high school students responding to a listing of environmental concepts paralleled the responses of an environmentally concerned adult population. Results indicate that all factors studied and all possible interactions of these factors except interactions involving treatment and grade level; sex and concern level; and grade, sex, and concern level are important influences in the assignment of importance to environmental concept statements. An examination of the responses of students treated with simulations revealed a high degree of clustering of responses and a decrease in polarization from pretest to posttest. The pattern of responses of junior high school students to environmental concept statements was observed to be similar to that of an environmentally concerned adult population.

Bart, William M., "A Hierarchy Among Attitudes Toward Animals," Journal of Environmental Education, 3(4):4-6, Summer, 1972.

A hierarchy of attitudes towards animals was developed. Such a hierarchy could prove useful in constructing a curriculum enhancing positive attitudes towards endangered species. Eighty-eight University of Minnesota student volunteers took a 30 item animal interest questionnaire. During the group test session they indicated whether they liked or disliked specific American animals. Using ordering theory, Bart produced a correlational hierarchy based on the responses. A table indicated the popularity rank of each animal with endangered species holding less popular rankings. The developed hierarchy demonstrated that holding positive attitudes towards "more popular" animals are a necessary prerequisite to developing similar attitudes for less-liked species. Bart showed that the higher in the hierarchy an animal placed, the greater the number of "subordinate" animals that must be liked before a positive attitude would be shown towards it. Endangered species usually placed high on this hierarchy. Positive attitudes towards these animals implied positive attitudes towards the whole animal kingdom, while attitudes towards more popular animals gave little definitive information about the others.

Burchett, Betty Martela, "A Descriptive Study of Fourth, Fifth, and Sixth Grade Student's Attitudes Relating to Environmental Problems," Dissertation Abstracts, 32(8):4439-A, 1972.

The purpose of this investigation was to attempt to foster and examine a positive attitude in fourth, fifth, and sixth grade students toward the solution of environmental problems through a sequence of instructional events using positively-oriented materials. Collection of data was accomplished by the following steps: An instructional package of positively-oriented lessons on selected environmental topics was prepared and a two-part test instrument, consisting of a semantic differential portion and a Likert-type portion, was constructed to be used as the pre-and post-test measure. Three subjects, one from each classroom, were selected from a population of 98 fourth, fifth, and sixth grade students from two elementary schools in the same system. Criteria for selection were pre-test scores and recommendations of teachers. Two of the subjects' initial attitudes toward environmental problems were found to be negative and the third was noncommittal. Instructional materials were used by student teachers during a six-week period in classrooms where the subjects were enrolled. Upon completion of the instructional sequence, the post-test was administered. The findings indicate that attitudes of the subjects toward environmental problems were positively influenced. Those toward the future environment were influenced to a greater degree than those toward the present. Gradual changes in attitudes were evidenced by the subjects in the interviews; however, it was impossible to identify the precise events which precipitated the changes.

Chase, Craig Carleton, "Changes in Attitude Toward Outdoor Education by Teachers and Administrators After Participation in the Cooperative Outdoor Education Project, Title III, E.S.E.A.," Dissertation Abstracts, 30(10): 4135-A, 1970.

The purpose of this study was to identify changes in the attitudes of school administrators and elementary teachers toward the usefulness of outdoor education in the achieving of academic goals. The population comprised all the in-service classroom elementary (K-6) teachers and administrators employed by the school districts of Williamson County, Illinois, for the 1967-68 school year. One hundred and sixty-five educators representing twenty-three school were involved. The Outdoor Education Inventory, for evaluating educators' attitudes toward outdoor education, was administered at the beginning and ending of the 1967-68 school year. The basis for score comparisons was the t-test of mean scores. The following conclusions were reached through the study: (1) There were significant differences in the attitudes of teachers (K-6) toward outdoor education before and after participation in the Cooperative Outdoor Education Project; (2) There were significant differences in the attitudes of school administrators toward outdoor education before and after their teachers had participated in the Cooperative Outdoor Education Project; (3) Sex was an identifiable characteristic in terms of the use of outdoor education techniques in the various academic areas; (4) The more academic preparation a member of the population studied had, the higher would be the scores attained on the test instrument; (5) Sex was an identifiable characteristic as to which academic areas would benefit from outdoor education studies; (6) The grade level of the teachers examined did affect their judgement as to what academic areas would benefit from outdoor education studies; and (7) The less experienced educators evidenced the greatest, positive attitude changes toward the use of outdoor education in the academic areas.

Eaton, John Lawrence, "Environmental Attitude and Health Knowledge of Tenth Grade High School Students," Dissertation Abstracts, 32(5):2566-A, 1972.

The purpose of this study was to investigate tenth grade students' attitudes toward environmental quality and health knowledge. A tenth grade vocational agriculture class, a tenth grade biology class and a random sample of all tenth grade students from each of the twelve randomly selected Pennsylvania schools were used in the study. The sample was subgrouped according to sex and residence: farm, suburban and urban. Evaluative criteria included the Health Education Test: Knowledge and Application, and an environmental attitude inventory utilizing the semantic differential technique. Analysis of the random-sample data revealed no significant differences between boys and girls in either health knowledge or environmental attitude. Likewise, no differences were found among students classified according to place of residence: farm, suburban, and urban. Correlation between health knowledge and environmental attitude was not significant. Vocational agriculture classes were grouped according to place of residence and compared with boys of the random sample. No significant differences were found among place of residence. Random sample boys or 'all boys' scored significantly higher in both environmental attitude and health knowledge than vocational agriculture boys. A relationship was found to exist between health knowledge and environmental attitude among vocational agriculture boys significant at the .05 level. Data from tenth grade students enrolled in selected biology classes were also classified according to sex and place of residence. There were no significant differences in health knowledge, when classified according to place of residence or sex. Environmental attitude scores of girls were significantly higher than those of boys, and farm residence students scored significantly lower than urban or suburban students. A relationship between environmental attitude and health knowledge of students was significant at the .05 level. The data from the twelve randomly selected schools were subjected to analysis of variance and Duncan's multiple range test. Data from three schools were significantly lower at the .05 level in health knowledge. There were no significant differences among environmental attitude scores of students from the twelve participating schools.

Esparo, Louis John, "An Assessment of Student Attitudes and Involvement in the Environmental Quality Program of the Mott Institute-Okemos Secondary School Project," Dissertation Abstracts, 32(3):1219-A, 1971.

The purpose of this study was to assess the efficacy of the Environmental Quality Program of the Mott Institute-Okemos Secondary School Project in the attitudinal, impact, and action domains. Three instruments were used. The School Inventory was selected to provide a measure of the extent to which students' attitudes about school were positive or negative. The assessment of student reactions to the course, student activities in the course, and student accomplishment of course objectives was accomplished through the use of the Secondary School Project Questionnaire, written specifically for this study. The Project Interview Schedule, developed by the writer was used to assess the impact of the course on the parents of the students in the course and community people. The School Inventory and the Secondary School Project Questionnaire were administered during the first week and last week of the first term. Interviews were conducted for the duration of the term. The data gathered were analyzed by analysis of significance between means. Major results were:

1. The students' understanding of what they want in life was shown to increase during their enrollment in the course.

2. The students' ability to use resources was significantly greater at the end of the term than it had been at the start.

3. Students' attitudes about school did not change.

4. The students' awareness of their privileges and responsibilities as citizens and their participation in citizen activities were shown to increase during the first term of the course. Additionally, students indicated that the course increased their citizenship awareness and participation.

5. The students' reaction to the course was shown to be strongly positive. Reactions of parents and community people were strongly positive, also.

6. The nature of the students' activities outside of school was shown to change significantly during their enrollment in this course. An increased interest and participation in community affairs was found.

Krahm, Barbara, "Attitudes and Opinions of Principals and Teachers Involved in an Experimental Earth Science Program in New York State," Dissertation Abstracts, 31(7):3218-A, 1971.

This study sought to determine the attitudes of selected principals and teachers relative to their (1) open and closed belief systems, (2) science commitment levels, and (3) opinions as to the extent of agreement or disagreement regarding the adoption and implementation of the Regents Experimental Earth Science Curriculum in New York State. The APP Theory (Attitudes, Perceptions and Process) was utilized as a conceptual research framework in the study. Data were obtained through an Opinionnaire. The Rokeach Dogmatism Scale, Form E, was used to measure the belief system, while the Schwirian Science Support Scale was used to measure science commitment. The third part of the instrument pertained to the appraisal of seven major factors involved in the adoption and implementation of experimental program. The Opinionnaire was sent to 89 principals and 105 teachers who participated in the 18 state-wide Experimental Earth Science Try-out Centers in New York State, during the 1968-69 school year. The following conclusions were drawn:

1. Closed belief system educators, who are encumbered by internal personal factors as well as external factors, positively appraised (1) adoption ease, (2) adoption influences, (3) nature of the program, (4) student learning, (5) parent reaction, (6) principal support, and (7) teacher qualifications higher than open belief system educators.

2. High science commitment principals and teachers, who support science, its products and practitioners, positively appraised student learning and the nature of the program higher than low science commitment educators.

Ladd, Florence C., "Black Youths View Their Environment," Environment and Behavior, 2(1):74-99, 1970.

Through the use of elicited map drawing, the study attempts to discover adolescent black males' subject definition of their neighborhood. Sixty Boston junior high students (12-17 years old) living in the same area were asked to draw a map of their neighborhood, indicating the location of their homes with an "X". The maps were grouped into four categories: pictorial, schematic, and maplike with or without landmarks. There was little or no relationship between map groups and subject's ages, grade levels, or length

of residence. Maps were highly differentiated in the estimate of neighborhood area represented, number of streets included, number of landmarks, map organization, identification and position of subjects' residences and accuracy. While such variation reflects individual differences, determining the social and/or psychological significance of map content requires (1) information on subjects cognitive styles, intellectual abilities and neighborhood activities; (2) accompanying verbalization through interviewing to assess personal meanings for boundaries, etc. The study illustrates that environmental learning begins with an individual's relationship to his immediate environment.

Lowen, Georgianna Heywood, "A Study of Elementary Education Majors' Knowledge of Conservation Concepts and Democratic Processes at the University of Southern Mississippi," Dissertation Abstracts, 32(5):2532-A, 1971.

This study attempted to measure elementary education students' knowledge of concepts of conservation and of democratic processes, according to selected standardized tests. The study also sought to determine the relationship between various educational and background experiences of the University of Southern Mississippi education majors and their knowledge of concepts of conservation and democratic processes involved in regulating natural resources. A sample of 200 junior and senior students from the total in the elementary education department was chosen by selecting classes in certain required courses. The Test of Reasoning in Conservation and the Principles of Democracy Test were administered to members of the sample. They also answered a background questionnaire concerning their academic preparation in conservation, democracy and related courses, as well as their participation in conservation-oriented activities and projects. Statistical techniques were the computation of t ratios and analysis of variance. Strength of relationships were determined by product moment correlation coefficient and partial correlation. The findings of the study indicated that there was no significant difference in the scores on the Test of Reasoning in Conservation between members of the sample and twelfth grade students who had taken high school conservation courses. The same was true for the scores on the Principles of Democracy Test. Furthermore, the University of Southern Mississippi Elementary Education Students who had taken academic courses related to concepts of conservation and/or concepts of democratic processes did not score significantly higher on the tests than those who had not. There were no relationships between conservation scores and the conservation experiences of the sample members, but there was a significant correlation between the scores of the sample members on the two test instruments, when the effects of the ACT were removed.

Lyons, Kathleen Pauline, "A Descriptive Study of Prospective Elementary Teacher's Attitudes Relating to Environmental Problems," Dissertation Abstracts, 32(3):4444-A, 1972.

The purpose of this study was to determine the effectiveness of a positively-oriented instructional program in developing a positive attitude toward environmental problems in selected preservice elementary teachers. The three subjects were chosen from among 33 elementary student teachers on the basis of diverse attitude ratings on a test instrument consisting of a semantic differential portion and a Likert-type opinionnaire on environmental issues. The subjects participated in six group-planning sessions which were characterized by free, voluntary expression and communication, shared planning and

appraisal of methods and materials. General topics included were ecosystems, litter, air pollution and water pollution. Methods of presentation were adapted from SCIS and ISCS curricular materials. It was concluded that (1) Participation in the program was effective in developing positive environmental attitudes; and (2) The subjects displayed a change in or reinforcement of attitude toward specific environmental issues.

Riblet, Donald Campbell, "Environmental Knowledge and Opinion Scales--Need, Design, and Use: A factor Analytic Study in Test Construction," Dissertation Abstracts, 32(12):6747-A, 1971.

The purpose of this study was to design, develop and construct two testing instruments: One to measure college student knowledge of environmental problem areas, another to determine subsets of environmental opinion. Factor analysis was used to confirm face validity and reliability of the test items. A survey was made of the institutions of higher learning in Florida to provide supplemental information as to the nature of education's response to the environmental issue, and to substantiate the belief that professional educators were moving to modify curriculum and instruction. Development of the Environmental Awareness Scale and the Environmental Opinion Scale was traced. Statistical methodology employed and computer techniques used were described. A listing was made of the items which survived both the factor analysis and subsequent definition of knowledge and opinion subscales.

Russo, Nancy L., "On the Psychological Readiness of Students to Study Population," Social Education, 36(4):357-362, 399, 1972.

College and high school students' attitudes toward population are discussed. Although awareness of the population crisis is widespread, many students see the poor having children they cannot afford as a major cause; students admit their population knowledge will not or has not affected personal family-size decisions. Blacks are less concerned than whites about significance of population problems and food shortage, more concerned with racial discrimination, poverty, etc. Blacks and Catholics reveal greater than average family-size expectations. Students, in general, disagree on birth control methods. The majority desire to marry and have children. They also see women in the traditional child-bearing role and have a negative image of the one-child family. Russo uses these findings to argue for taking sociocultural orientations into account when planning population awareness experiences.

Solid, Myron Lee, "The Use of a Comparative Analysis as an Evaluation of a Junior High School Conservation Education Program," Dissertation Abstracts, 32(8):4496-A, 1972.

This study investigated the existence and magnitude of differences in attitudes and knowledge of conservation of natural resources in two similar Colorado communities where one community had a conservation education program as a part of a school curriculum and the other did not. Students in the junior high and senior high schools of each community and adult residents within each community were surveyed by means of a questionnaire. The questionnaire was designed to measure attitudes toward conservation, knowledge about conservation,

and receptiveness to clubs or organizations which exist for the promotion of conservation. Additional information about conservation activities and applications of conservation knowledge in the study communities was secured by purposeful observation by the investigator, combined with informal interviews with a sampling of residents. The dependent variables, attitude and knowledge, were analyzed within a 2 x 2 x 3 factorial design which consisted of two communities, sex (male and female), and three levels of age groups (junior high students, senior high students, and adults). Analysis of variance and t tests were utilized. The analysis indicated that the community with a conservation education program in its junior high school exhibited more favorable attitudes toward natural resource conservation and knowing more about conservation than the community that had no formal conservation education in its schools. The greatest difference between the study communities in conservation attitudes and knowledge was shown by the senior high students. Within the community with conservation education in a school, students and adults who had taken the course demonstrated more knowledge and more favorable attitudes toward conservation than those of the same community who had not taken the course. Adults exhibited the most favorable attitudes and greatest amount of knowledge. In both study communities there were other sources of learning such as governmental agencies which were available to adults and were effective in disseminating information about conservation and in promoting awareness of natural resources. The study communities indicated almost equal responsiveness to the activities of a conservation club. Other results of the investigation showed that residents living in urban areas had more favorable attitudes toward natural resource conservation than rural residents, members of professional occupations held the most favorable attitudes toward conservation and demonstrated a great amount of knowledge of conservation, and favorable attitudes and knowledge about conservation increased with the amount of formal education obtained.

Stronck, David R., "A Questionnaire on Environmental Issues," The American Biology Teacher, 34(4):212-214, 1972.

The survey created and conducted by high school students in Westlake Hills, Texas, to discover community attitudes toward environmental problems is discussed. The 17 item questionnaire, employing Likert-type responses, was administered to four groups: seventh-graders, tenth-graders, college students and parents of local school children. The mean scores for each group were not significantly different. However, significant differences did emerge on specific questions. While older groups saw technology as a "problem-solver," younger groups saw technology as threatening man's survival. Seventh-graders in particular were least interested in learning how to use technology wisely. Seventh-graders were also less concerned about population growth than other groups and were skeptical of local rather than federal or state ordinances to control pollution. In contrast, parents saw local control as the preferred governmental channel to environmental quality. Parents were more in favor of reduction in gasoline usage than tenth-graders. The prestige of driving for high schoolers may have produced this difference.

Stronck, David R.,"Attitudes on the Population Explosion," The Science Teacher, 38(8):34-37, November, 1971.

This study probed the attitudes of several groups of people, including students, teachers, and other adults in Austin, Texas, regarding the management of human population. Garrett Hardin's "Graduated Checklist of Heresies" was used for one of the questionnaires. The significant findings were that biology teachers were most alarmed by the population explosion. They felt that, ultimately, direct coercive control of individual breeding will be necessary. High school students differed from biology teachers and other adults in their optimism and resistance to coercive measures.

Swan, James A., "Response to Air Pollution: A Study of Attitudes and Coping Strategies of High School Youths," Environment and Behavior, 2(2):129-159, 1972.

Study had twofold purpose: (1) to develop and test instrument which will give accurate indication of public response to air pollution; (2) to identify some of the factors which affect such responses. Subjects were 45 racially mixed (75% Black, 25% White) male high school seniors from a Detroit neighborhood with poor air quality. Research design had two phases: (1) use of questionnaires and select photos to determine the relationships between subjects' concern, knowledge and visual awareness of air pollution; (2) highly-concerned subjects were presented with a gaming simulation involving individual's attempt to solve specific air pollution problem. Results: "new" instruments of select photos and gaming simulation were suitable to subjects; socioeconomic status positively correlated to awareness; race not correlated to awareness; awareness not necessarily correlated with concern for air pollution; concern highly correlated with individual's willingness "to explore", i.e., participate in community affairs, belief in his control of his environment. Black "high explorers" showed high community involvement but poor response to simulation, vice versa for whites. Author's note: Blacks see other problems (e.g., discrimination, jobs, etc.) as needing immediate attention.

A-4. Environmental Education Programs

These articles include both broad surveys of programmatic efforts in environmental education as well as descriptions of specific programs or courses.

Havlick, Spenser W., "A Glimpse and Analysis of Environmental Education Opportunities in American Higher Education," Journal of Environmental Education, 1(1):21-24, Fall, 1969.

What is being done on college campuses to provide students with an effective environmental education learning experience? A pilot study carried out at the University of Michigan demonstrates the enormity of effort to identify and evaluate courses and programs in environmental education. Ninety professors from 24 institutions which offered specific programs or courses were chosen by reputational and positional techniques, and interviewed personally. Interviews indicated that 1) college students have an inadequate understanding of the environment, 2) most environmentally-related courses do not focus on

community environmental problems or what the individual citizen can do about them, and 3) there is a serious absence of vigorous environmental education programs in education departments.

Little, Warren Masters, "A Survey of Training Programs for Auxiliary School Personnel in Environmental Education in New England with Emphasis on the Role of Environmental Aides," Dissertation Abstracts, 32(12):6717-A, 1971.

The purpose of this investigation was to gather data and informed opinion about environmental aide programs in New England. Five environmental aide programs were identified and are described in some detail. The investigator conducted a structured interview with the administrator of each program. Through the use of a questionnaire, the investigator also sought information from aides, selected teachers, and administrators in the five programs as to how they perceive the role and functions of the environmental aide. A review of the data collected by the investigator in the course of surveying the five programs for the study suggests that there is a female population within suburban towns who are enthusiastic about environmental education and who are interested in working in this area in the schools or in nonformal educational organizations. These women see the need and have the time. They are willing to volunteer their services. The study suggests that there is potential for role conflict between such community members and teachers in that the former appear to see themselves as "environmental specialists" supplementing the teachers' work in environmental education. The teacher is looking for assistance of a more supportive nature, seeing the community member in the role of an "environmental aide," which is closer to the more traditional concept of a teacher aide. Finally, the investigator found that participants in all of the programs studied had ideas for improvements which they were willing to discuss, and these should be of great value to future administrators in developing stronger environmental aide programs.

Miles, William Raymond, "Environmental Conservation Education in Minnesota's Colleges and Universities," Dissertation Abstracts, 32(3):1300-A, 1971.

This is an analysis of the attitudes, policies, and present and future planned programs in environmental conservation education at the college level in Minnesota. The two-part analysis expolres the attitudes of teachers and administrators at all educational levels in Minnesota; and the present and planned educational programs in Minnesota's colleges and universities. Survey methods included: direct mail questionnaires to representatives of each of Minnesota's 41 colleges and universities and a stratified random sample of 750 elementary and secondary educators in Minnesota's schools; a catalog survey of Minnesota's colleges and universities; and a schedule of interviews with selected educators and conservationists. Some conclusions reached: (1) Elementary and secondary educators in Minnesota's schools are better prepared to teach and are teaching more environmental conservation than is reported; (2) Environmental conservation studies should be integrated into subject areas in all elementary and secondary grades; and (3) Educators unanimously affirmed the need for inclusion of environmental conservation in educating youngsters and teachers.

Railton, Esther R., "Education's Outer Space," Journal of Outdoor Education, 6(2):7-12, Winter, 1972.

The author visited 31 outdoor education programs associated with camps, schools and colleges to survey the current state of outdoor education programs. Informal staff visits using several directed, yet open-ended questions produced in-depth information. The author concludes that outdoor education is very much part of the American school scene. The trend is increasing, although some suburban schools are cutting programs due to lack of funds. There is a strong tendency to relate outdoor learning to indoor learning and toward interdisciplinary study. With emphasis on individualized learning, discovery methods and non-grading (new to outdoor education) have evolved. Colleges have begun to relate theory to practice and utilize interdisciplinary approaches to environmental problems.

Trent, John, "Status of Environmental Science in Colleges of Education," Journal of Environmental Education, 3(4):53, Summer, 1972.

A survey was designed to determine the emphasis given environmental science in colleges of education. A questionnaire was sent to 140 colleges randomly selected from the 1967 yearbook of the American Association of Colleges for Teacher Education. Of these, 108 replied to the four yes-no questions on course offerings, faculty involved, and possible environmental science teaching degrees. Results indicated a majority of colleges were not offering an environmental science methods course, involved in government environmental science projects, or offering degrees in environmental education. However, a majority of colleges surveyed were offering a course involving environmental content and were involved in EE curriculum development to some extent. Implications are that colleges should introduce methods courses in environmental education and consider the offering of majors and minors in environmental science.

Wilkins, B. T., and McNeil, R. J., "Evaluating a University Extension Conservation Program," Journal of Environmental Education, 2(2):43-46, Winter, 1970.

New York's Cooperative Extension educational program on wildlife management was evaluated. Meetings were held in Rochester (35 participants) and Buffalo (89), with participants given a pre- and post-test after a 90 and 30 minute wildlife presentation, respectively. The 25 item true-false tests were analyzed and respondents characterized according to occupational class, acreage owned, years owning a parcel of land, reasons for interest in game animals, and specific positive wildlife practices carried out. Results indicate that the 1) largest percentage in attendance were professional workers (not farmers), and not "new" owners of their land, 2) improvements of land depend on interest in game animals, 3) attendees gained knowledge of wildlife from meeting, but fact retention could be improved through the distribution of printed material. Information on plantings for wildlife would be well received by this type of audience. Test results could be useful in designing future wildlife educational materials and presentations, and in evaluating the effectiveness of the teaching and program.

Wright, James Henry, "The Effect of a Television-Oriented Inservice Program on the Elementary Teacher's Attitude Toward Some Components of Environmental Education," Dissertation Abstracts, 32(10):5662-A, 1971.

The purpose of the study was to test the effect of a television-oriented inservice program on the elementary teacher's attitude toward some components of environmenaal education. A semantic differential attitude measuring instrument was developed for the study. The pilot instrument, which contained ten components and related scales, was administered as an immediate test-retest to a group of seventy elementary teachers who represented elementary teachers from all geographic regions of the United States. A Pearson product-moment correlation of .80 was obtained from that group for the TOTAL instrument. Those coefficients of reliability, coupled with the apparent face validity of the instrument led to acceptance of the instrument for measuring elementary teacher attitude toward environmental education components of the study. An experiment was conducted to test the effect of a television-oriented inservice program on the elementary teacher's attitude toward air and water pollution, high human population densities and some selected concepts of ecology. The conclusions of the experiment were:

1. A television-oriented inservice program on environment promoted elementary teacher attitude change toward the TOTAL of all environmental education study components in the direction of a more favorable attitude toward the TOTAL of all study components.
2. A television-oriented inservice program on environment promoted elementary teacher attitude change toward the study components of WATER POLLUTION, QUALITY ENVIRONMENT, and AN UNDERSTANDING OF BIOTIC INTERRELATIONSHIPS. The change was in the direction of a more favorable attitude toward those components.
3. The television-oriented inservice program did not promote elementary teacher attitude change toward the seven other study components of environmental education.
4. Years of teaching experience was not a significant factor in elementary teacher attitude change.

A-5. Outdoor Facilities, Site Development, and Administration

Studies in this section pertain to the outdoor education dimension of environment education.

Crocicchia, George Anthony, "Outdoor Education: A Descriptive Survey of Programs and Trends for Elementary Schools in the State of Maryland," Dissertation Abstracts, 32(8):4236-A, 1971.

The purpose of this study was to identify the existence of organized outdoor education programs throughout the public school in Maryland and to identify and describe trends in organization, administration, curriculum, facilities, and personnel of existing outdoor education programs. Sources of information for this study were limited to the superintendents of the school systems and the 14 systems which acknowledged sponsoring an organized outdoor education program within their school system for the 1970-71 school year. The principal procedure used in the gathering of the data was a survey questionnaire designed

to obtain opinions and factual information from the outdoor education director and teachers concerning the outdoor education administration/organization, curriculum, facilities, and personnel. The following conclusions were made:

1. All 14 school systems sponsoring outdoor education plan to continue and, if possible, to expand their program.
2. The 14 programs represent both resident overnight outdoor programs and nonresident day-only programs. Some school systems sponsor two or more resident programs.
3. Outdoor education resident facilities should be administered by an outdoor school principal who has complete administrative and supervisory responsibility for the program. This person should devote at least 80% of his time to outdoor education.
4. Curriculum guides on outdoor education vary from system to system and many of the guides appear to be administrative handbooks.
5. Most school systems utilize the classroom teacher as an instructor at the resident facility or expect the teacher to conduct outdoor follow-up activities. Too few school systems provide adequate in-service training in outdoor education teaching concepts for classroom teachers.

Fenderson, Carl Nathaniel, "Maine Parks and Their Role in Conservation Education Programs," Dissertation Abstracts, 31(1):60-A, 1970.

This investigation deals with the history of state park development in Maine and some educational opportunities in the parks. The three most influential factors in shaping Maine's state park program were philanthropy, New Deal programs of the depression in the 1930's, and the threat of federal controls. There is no indication that any kind of a social movement was a factor in development of Maine park programs. Education programs, with some exceptions, are either entirely lacking or poorly developed in the Maine park program.

Hardham, Virginia B., "The Wisconsin Department of Natural Resources' Conservation Education Center, Poynette: An Evaluation," unpublished M.S. thesis, University of Wisconsin-Madison, 1971.

This study evaluates the Conservation Education Center at Poynette, Wisconsin. Center employees were asked to complete questionnaires which asked for their opinions on the Center and its future function. Respondents definitely favored increased emphasis on education through further development of printed materials, increased guide service, encouragement of more student participation than is now possible, and provision of overnight camping facilities for groups wanting to stay more than a few hours for study. Other questionnaires were used to obtain information on the function visitors wished the Center to serve. Only school groups were included in this sample, as these comprised by far the majority of visitors. Students of fifth grade and above and teachers of all grades were given questionnaires which asked their opinions of the Center. Teachers were also asked to suggest improvements in the teaching materials sent by the Center, to state their objectives for their visit, and to suggest improvements in the Center. Teachers generally agreed with the Center employees' suggestions. Unfortunately, at present the Center is too limited in staff and funds, and allows too many visitors to use the Center each day to offer increased guide service or provide for greater student involvement.

Hunt, Kenneth W., "Antioch's Glen Helen," Journal of Environmental Education, 2(3):30-32, Spring, 1971.

Hunt reports on activities at the Antioch College nature reserve, Glen Helen, and its environmental influence on southwestern Ohio. The historical development of the reserve since 1946 is detailed, including the creation of nature trails, school forests, a trailside museum, an outdoor education center, a riding center, outdoor education conferences, and a Glen Helen Association--dedicated to the preservation of the reserve. Hunt concludes that all the programs have been well received and stimulated the founding of nearby riding centers and camps (4-H, and school). The threat of encroachment is briefly treated by appealing to schools, organizations, and visitors who used the park, sufficient pressure was placed on state government to relocate a planned highway and disposal plant off the Glen Helen reserve.

Jones, Orville E. and Swan, Malcolm D., Jr., "Parent's Perceptions of Resident Outdoor Education, Rockford Outdoor School and Taft Campus, Illinois, A Comparison, Spring, 1971," Journal of Outdoor Education, 6(2):17-20, Winter, 1972.

This comparative study examines parent's perceptions of two resident outdoor education programs: the Rockford, Illinois' Outdoor School and Lorado Taft Field Campus program. The study determined parents' opinions about: 1) Values and outcomes of the experience; 2) Whether the program should continue as part of the educational system; 3) Who should assume financial responsibility; and 4) The kinds of improvements parents think should be made. About 1,400 opinionnaires were distributed to parents of pupils who had participated in one of the two programs during 1971. 566 were completed and returned, about equally split between parents of pupils participating in the two school programs. The Chi-square statistical test was used to compare responses on specific items. Results of the study indicate both programs were valuable experiences and should be continued. Ninety-five per cent of both parent groups endorsed a similar program for all children at some time while in school. Participating parents from both programs were also willing to assume much of the financial responsibility. Analysis of response data showed that Rockford parents felt their children were (1) better acquainted with their teacher, (2) talked more freely at home about their experience, (3) appeared more knowledgeable about good conservation practices and pollution problems, (4) had increased their knowledge of geology and weather, and (5) showed a more improved attitude toward school in comparison with parent perceptions of the Taft pupils. According to parents, more of Taft pupils felt the experience was "merely a week of fun." Sex differences were also indicated by the data.

Schafer, Rudolf J.H., "Toward an Environmental Ethic," Journal of Environmental Education, 1(2):54-55, Winter, 1969.

Modernizing California's conservation education (1966-1969) and its effect on the State Board of Education, legislature, schools, and the general public is the essence of this progress report. The author examined the activities of state bodies as instruments in making these changes and their effect in instituting them. The recommendations of the 1969 Conservation Education Advisory Committee provides the guidelines of Schafer's appeal to save and improve the conservation education program. He finds progress to date has been poor, and the program may be seriously hampered. More financial support is needed.

A-6. Outdoor Recreation

These studies focus on selected recreational aspects of environmental education programs.

Clark, Roger N., Hendee, John C., and Campbell, Frederick L., "Values, Behavior and Conflict in Modern Camping Culture," Journal of Leisure Research, 3(3):143-159, 1971.

Campers' attitudes and managers' perceptions of those views important in campground management are reported. Questionnaires given to campers in modern campgrounds and mailed to management personnel in Washington State showed that campers prefer "modern facility" campsites to primitive types; despite their seeking traditional environmental goals (e.g., isolation, wilderness), campers are not disturbed by other campers as managers assumed them to be; managers are more aware of behavioral problems (e.g., theft, littering) and assumed more awareness than exists in campers; managers expect more apathetic responses to problem situations (e.g., reporting a theft) than campers claim (but other research shows manager assessment to be correct in campers' actions, if not intentions). Variation in roles, training and contact with wilderness may be causes of attitude differences between campers and managers. The authors state that modern campground users' desires and attitudes should be considered when planning campsites and communicating campsite problems.

Hendee, John C., "Rural-Urban Differences Reflected in Outdoor Recreation Participation," Journal of Leisure Research, 1(4):333-341, 1969.

This study summarizes the two types of theoretical approaches guiding outdoor recreation research: (1) rural-urban recreation differences are based on the influence of size and population density on man's behavior; (2) rural-urban recreation differences are based on the influence of culture on man's actions. The first group includes (a) opportunity theory (participation in outdoor recreation is a function of its availability) and (b) population density (man seeks, periodically, experiences with lower ordinary levels of social contact). The second group includes (a) work-oriented groups (like protestant-ethic farmers are not oriented to recreation), (b) outdoor recreation is an "American" value institutionalized by Boy Scouts, 4-H, etc., (c) urban "appreciative" versus rural "utilitarian" attitudes toward nature, (d) people seek leisure experiences either similar to or sharply contrasting with everyday life or which remind them of childhood experiences, and (e) urbanism leads to lowered environmental sensitivity due to an individual's need to protect himself from over stimulation in the megalopolis. Hendee recommends that studies 1) state population density of subjects' residences, 2) include subjects' childhood upbringing experiences, 3) take into account demographic variables, and 4) try to get representative population samples.

Hendee, John C., Gale, Richard P., and Cotton William R., Jr., "A Typology of Outdoor Recreation Activity Preferences," Journal of Environmental Education, 3(1):28-34, Fall, 1971.

A study of outdoor recreation attitudes based on stated preferences of the recreationists, rather than on their observed behavior was conducted. (Observed activities are often limited by the range of activities possible within the study environment.) 55% of the 4502 wilderness users in Washington State receiving a questionnaire in 1966 responded. They selected their preferred recreation activities from a list of twenty-six on the instrument. Activities were then analyzed by classifying them into five conceptually related groups: appreciative-symbolic, extractive-symbolic, passive-free-play, sociable-learning, and active-expressive. Relationships were found between age and preferred activities, probably because of decreasing physical ability. However, although increasing age does necessitate a change in activity preference, the change will be to conceptually-related activities. For example, those preferring appreciative-symbolic activities such as mountain climbing will, as they age, change their preference to a less strenuous but conceptually-related activity as photography. Preferences were also dependent upon education.

Moncrief, Lewis W., "Trends in Outdoor Recreation Research," Journal of Leisure Research, 2(2):127-130, 1970.

This paper presents a survey of research trends in recreation. Some general trends include: less frequent discursive, unstructured observation studies; more emphasis on quantitative studies and exploratory research; increasing difficulty in obtaining funds for specific and non-generalized problem situations. Some specific trends noted: fewer simple user preference studies and more theoretical contribution studies; more attempts to identify visual environmental components which provide the most aesthetically pleasing experience; more economic research (e.g., impact of recreation planning on regional economics); greater concern with social interaction and other behavior among users of managed resources. Evaluation of these studies indicates that researchers need better statistical backgrounds, while planners must be able to interpret these new research forms. A need for writer-communicators to interpret research to users is also evident.

Moss, William T., and Lamphear, Stephen C., "Substitutability of Recreational Activities in Meeting Stated Needs and Drives of the Visitor," Journal of Environmental Education, 1(4):129-131, Summer, 1970.

The relationships among recreational activities, their compatibilities, and their evaluation according to personal needs served is discussed. College students completed a questionnaire designed to determine their participation in various recreational activities. Factor analysis grouped activities into related clusters. Personal needs satisfied by these activities were measured by the Edwards Personal Preference Schedule (EPPS). The activity clusters generated were distinct and enabled the correlations between various activities to be determined. By clustering positively related activities into groups and relating them to certain measurable human needs on the EPPS, recreational areas can be made more pleasurable and can satisfy as many needs as possible.

Shafer, Elwood L., Jr., "The Name of the Game is Recreation Research," Journal of Environmental Education, 2(1):30-34, Fall, 1970.

This paper explores possibilities for using a systems-analysis approach in solving outdoor recreation problems and devises a methodology for classifying various aspects of the approach. Utilizing the rationale of systems engineering, the author defines a system and method for determining its effectiveness. A mathematical model is constructed to duplicate the behavior of the recreation system or subsystem. This model is then manipulated. Applying this method to a few recreation studies by the Northeastern Forest Experiment Station of the U.S.D.A. Forest Service, it was found useful in distinguishing camper's preferences of physical characteristics of campgrounds, defined the components of a successful private skiing enterprise, and successfully described preferences for landscape photos in the social-psychological environment. The system is also useful in natural resource and organizational environments. Shafer implies that the systems-analysis approach can provide better solutions to problems in recreational resource management.

A-7. Environmental Perception

These studies focus on the "how" and "why" of human perceptions of various environments.

Appleyard, Donald, "Styles and Methods of Structuring a City," Environment and Behavior, 2(1):100-118, 1970.

This study investigated how residents mentally structure their city. Seventy-five subjects drawn from the four districts of an Eastern Venezuelan city (each district sample was representative of the total population in age, sex, education, length of residence and mode of travel) were asked (1) to draw a map of the whole city including places and points remembered through free recall and (2) to draw a map of his (her) neighborhood including places considered important to remember. Two types of map emerged: sequential (road) and spatial (buildings, landmarks, districts). Maps by the poorly-educated tended to have inaccurately related elements, revealed mismatches between names and places, and were non-inferential (predicted little beyond direct experience). The more educated drew more objective, coherent and inferential maps. Long-time residents made greater use of spatial elements; car riders produced more coherent maps than bus riders; females showed preference for spatial rather than sequential structuring, perhaps indicating their preference for security and containment.

Appleyard, Donald, "Why Buildings are Known: A Predictive Tool for Architects and Planners," Environment and Behavior, 1(2):139-156, 1969.

This study determined why buildings are remembered by urban dwellers. Three-hundred persons from various residential areas of a Venezuelan city representing a broad cross-section of the population were presented with three tasks: (1) a free verbal recall of city points remembered best; (2) a free recall drawing maps indicating points mentioned; and (3) a free trip recall describing features of a particular city road. All sites mentioned were recorded, photographed and scaled by investigators to discover the attribute array causing their recall. The following attributes of buildings affected recall: (1) the distinctiveness of its physical form, "imageability"; (2) its visibility while an inhabitant travels around the city; (3) its role as a setting for personal activities, use and other behavior; (4) inferences an inhabitant makes about its cultural significance to the population at large. The author speculates that these attributes may be applied to perceptions of an entire urban environment.

Blaut, James M., McCleary, George F., Jr., and Blaut, America, "Environmental Mapping in Young Children," Environment and Behavior, 2(3):335-350, 1970.

This study sought to appraise the environmental mapping abilities transforming macro-environmental information into a cognitive map or concrete representation of the environment of young children. It was postulated that three elements of the transforming process--perspective, distance measurement, and semantic interpretation--are essentially primitive behaviors present even in young children. A test population of pre-literate first-graders from Worcester County, Mass. (107), and Rio Padices, Puerto Rico (20), ages 5-7, were asked to identify features (e.g., house, car, street, tree, etc.) on oblique and vertical aerial photographs. Another test population of Worcester children (47) were asked to identify features on a vertical photograph, prepare a tracing from the photo, interpret the traced pattern after the photo had been removed and operate the tracing as a map in the solution of a simulated navigation problem. The high percentage of success in performance serves as evidence of the presence of mapping abilities and suggests that the teaching of macro-environmental concepts from biology, geography and social science need not be postponed until literacy is acquired.

Carr, Stephen and Schissler, Dale, "The City as a Trip: Perceptual Selection and Memory in the View from the Road," Environment and Behavior, 1(1):7-36, 1969.

Factors which influence peoples' perception and memory of one dimension of urban environment, the highway, was studied. Forty-nine subjects divided into three groups (drivers, front-seat passengers on the route for the first time and regular commuters) travelled a 3.5 mile stretch of the Northeast Expressway in Boston, Massachusetts. Results of eye-movement tests (via a head-mounted eye recorder) revealed that different subjects tend to look in the same directions while travelling. Memory tests (free recall, verbal and graphic maps, detailed descriptions) revealed that all riders tended to remember the same things in the same order of importance; familiarity with the route did not change what was remembered; drivers and passengers tended to remember the same items. The study shows that despite the influence of individual cognitive and affective factors, urban designers can plan and construct environments which permit inhabitants to easily perceive and remember meaningful elements.

Downs, Roger M., "The Cognitive Structure of an Urban Shopping Center," Environment and Behavior, 2(1):13-39, 1970.

Which elements of an urban shopping center are most important in the consumer's "image" of the center? A sampling of housewives was presented with nine categories to evaluate a shopping area derived from prior research, and asked to respond to them. These data were incorporated in the second stage of the research, a semantic differential which a new group of female subjects used to evaluate a local shopping center. Categorized and ranked in order of importance, results indicated those factors determining consumer behavior are (a) retail establishment factors (service quality, price,shopping hours, and shop range and quality) and (b) structure and function of the shopping center (structure and design, internal pedestrial movement, visual appearance, and traffic conditions).

Lee, Terence, "Perceived Distance as a Function of Direction in the City," Environment and Behavior, 2(1):40-51, 1970.

One hundred and fifty college students' (75 male, 75 female) estimated walking distance to 22 distinctive inward and outward destinations in a city. Although both types of directions were overestimated, the error was much less for inward directions. Factors such as familiarity and desirability of particular destinations and directness of the perceived journey (number of corners, pedestrians, traffic) revealed some influence in test results. Lee proposes that residents' mental images of their city are affected by their location from the city's center.

Shafer, Elwood L., Jr., "Perception of Natural Environments," Environment and Behavior, 1(1):71-82, 1969.

This study (1) rated variations involved in spatial and psychological perceptions of natural environments, (2) described methods used to measure these perceptions, and (3) suggested guidelines for future research. Variations in perception originate within the human mind, as well as the individual's use of his senses (smell, taste, sight, etc.), the purpose he has for recreation (utility or aesthetics) and various combinations of these factors. Measurement of perception may be direct (ask the recreationist to cite important outdoor features) or indirect (establish correlations between land features and use). Multivariate analysis can assess how perceived elements are distributed throughout an environment, while differentiated photographs may be employed in recreationist interviews to determine preferences.

Sonnenfeld, Joseph, "Equivalence and Distortion of the Perceptual Environment," Environment and Behavior, 1(1):83-99, 1969.

The factors which influence a population's sensitivity to different elements in the environment were determined. Concept variables (e.g., snow, night, spring) and scale variables (e.g., like-dislike, cold-hot) were tested on junior high-school students in Newark, Delaware, and in three differentiated geographic areas of Alaska (Barrow, Wainwright and Anaktuvuk Pass) using the semantic differential technique. As was hypothesized, there was little difference among groups in evaluating their different environments. Although this finding is explained by human adaptation principles (such as people in colder climates

build sturdier houses), the ability of different populations to perceptually, if not actually, occupy similar environments supports speculation that within any given population there exists a personality mix. This mix consists of a variety of character types with varying environmental sensitivities. (Additional research shows patterns of individual preference for environmental elements. For example, individuals who like storms also consider the environment challenging.)

Winkel, Gary H., Malek, Roger, and Thiel, Phillip, "The Role of Personality Differences in Judgments of Roadside Quality," Environment and Behavior, 1(2):199-224, 1969.

The relationship between personality factors and environmental preferences (specifically, visual preferences for roadside development) was studied. Eighty subjects, 40 college students and 40 non-student adult volunteers, observed slides of different roadsides (both landscaped and commercial routes) and rated them according to 64 bi-polar adjectives. This sample then observed the same, re-touched slides (with telephone poles, billboards, etc., removed) and were asked to indicate noticed differences and, if needed, to reevaluate adjective scales. The subjects also completed personality and demographic questionnaires. Eye movement recordings of the subjects' observations combined with information from the personality questionnaire identified 3 influential personality factors: (I) a negative orientation to the urban roadside, (II) a belief in conservation, preservation and maintenance of order, and (III) a desire for an action-oriented environment. The factors correlated highly with subjects' roadside evaluations. Subject characterized by "I" saw the highway as monotonous, depressing and useless. The "III" group perceived the contemporary environment as a source of visual stimulation and were positive toward the roadsides. Information about group "II" was less conclusive but preferences for individual elements, such as trees, rather than a global orientation was evident.

B. Environmental Communications -- General

The articles cited included here include both expository discussions and historical treatises about aspects of environmental communications. They do not report the results of research, but an examination of their substance should point the way to fruitful research endeavors.

Evison, Q. Boyd, "Communications Research for the National Park System," unpublished M.S. thesis, University of Wisconsin-Madison, 1969.

Fischer, Kenneth P., "How Stephen Mather Sold the Park Service Idea," Journal of Environmental Education, 2(4):21-24, Summer, 1971.

Horn, B. Ray, "The Group Dynamics of Eco-Action," Journal of Environmental Education, 3(1):35-42, Fall, 1971.

Levin, Felice Goodman, "Historic Conflicts in Conservation Communication," Journal of Environmental Education, 3(3):36-38, Spring, 1972

Ross, John E., "Azimuths in Conservation Communications Research," Journal of Environmental Education, 1(3):88-92, Spring, 1970.

Schwartz, James A., "Ernest Swifts' Use of Public Relations to Promote Conservation," unpublished M.S. thesis, University of Wisconsin-Madison, 1969.

B-1. Communications Research Approaches

Entries in this section focus on media content, performance, and communication process and theory.

Brand, W. Jean, "Family Planning Communications in an Extension Low-Income Program," unpublished M.S. thesis, University of Wisconsin-Madison, 1971.

This study describes the status of, and need for, family planning information and communications in the Expanded Food and Nutrition Education Program (EFNEP) of the Cooperative Extension Service. A national random sample of EFNEP aides, stratified by state, was drawn for a questionnaire survey through state and county Extension offices. There were 364 responses. Nearly two-thirds of the aides said they had been asked for family planning or birth control advice by women and girls in the EFNEP program, and 96.6% of those asked had given advice (usually referrals) or had volunteered family planning advice (40%). Three-fourths of the respondents said their clientele would like to learn more about this subject, and 93.7% observed clientele need for such information. Men in EFNEP families need to learn more about family planning, according to 87% of aides. They appealed for birth control education for teenagers. Over 60% of the aides have practiced birth control themselves and about 94% think families should plan for children. Neither belief in family planning nor use of birth control methods is significantly related to either religious or ethnicity variables. Aides' general knowledge of the efficacy of various contraceptive methods is fairly correct, measured by clinical standards, but could be improved upon. Aides attribute clientele non-use of contraception to (1) fear that the methods are dangerous, (2) lack of knowledge of how to use them, and (3) objection of the male partner. Aides (87%) are willing to teach women and girls about family planning and birth control if they had training but only 28% say they have had such training. They do not see themselves or the clientele as high users of mass media, have little interest in using such media to teach this subject, preferring to talk to one woman at a time.

Chapman, Donald K., "The Special Interest Group as a New Story Catalyst: A Story of the Sierra Club," Journalism Abstracts, 8:52, 1970.

The Sierra Club's relationship with media was examined through a study of its conservation campaigns involving the San Francisco Bay and Mineral King Valley, Sequoia National Forest. The study considered the questions: (1) Is the nature of the activities of the Sierra Club such that the club serves as a news catalyst; (2) Is news dissemination effective in building public awareness about problems in the conservation area? The findings indicate that the club contests perceived threats to the public domain, resultant campaign battles are newsworthy, and the latter did arouse public awareness in the cited campaigns.

Clausing, Jane, "The Ecological Message of the Outdoor Magazines," Journal of Environmental Education, 2(4):10-12, 1971.

This study reports a content analysis of 201 articles from the 36 issues of Sports Afield, Outdoor Life, and Field and Stream over 1966-1968. Main headings used in categorizing paragraph references were Environmental Information, Recreational Preferences, and Hunting and Fishing Values. In general, these magazines emphasized the interests of rural fish and game conservation; recreational interests were consumptive, as opposed to appreciative, and were oriented toward primitive and natural experiences. The emphasis in hunting and fishing values was mainly on sportsmanship/skill and secondarily on recreation. Field and Stream has a relatively broad view of conservation and emphasized appreciative nature activities more than other magazines, stressed game management and wilderness preservation less than the others, and had the most emphasis on the broader categories of environmental information. Outdoor Life emphasized primitive, natural experience, sportsmanship, skill, trophy competition and consumptive values. It had the least emphasis on broader categories of environmental information. Sports Afield was the most urban oriented. The magazines did not give quality of the environment the emphasis it deserved in view of the decreasing spatial availability for hunting and fishing activities.

Halliwell, Betty Marie, "A Method for the Content Analysis of Cartoons: The Case of Attitudes Toward Contraception and Population Growth," Dissertation Abstracts, 33(2):775-A, 1972.

This report focuses on how perception of cartoons affects and is affected by attitudes. A method of content analysis applicable to cartoons and adaptable to other representational and entertainment forms is developed. The analytic method begins by identifying types of elements and relationships in terms of the canons of the form to be analyzed and in terms of culturally meaningful content of the elements combined in the form. This analytic approach was developed in terms of the cartoon by uniting uses and gratifications theory with insights from psychology, art and literary criticism, and practical cartooning. Specific coding categories are developed in terms of the defined body of content which is to be analyzed. To demonstrate the method, cartoons about birth control or population growth were analyzed. These were taken from the major cartoon carriers among United States magazines published in the 1960's. Cartoon content is compared for four groups of magazines: three quality, three medical, three middle-class, and two men's magazines. Analysis of the data shows considerable overlap in themes and gratifications paralleling readership characteristics: men's and medical magazines focused most heavily on sex fantasy gratifications and contraception themes, while medical and quality magazines reflected awareness of population growth. Middle-class magazines had far fewer cartoons in either subject area than the other three groups; these few centered on expressions of hostility toward children. Each group had characteristic preoccupations appropriate to itself, and all patterns found bore out existing expectations regarding correspondences between media content and preoccupations of target audiences.

Hamilton, Ralph L., "Effects of an Experimental Direct Mail Service Upon Technical Forestry Knowledge of Tennessee Small Woodland Owners," unpublished Ph.D. thesis, University of Wisconsin-Madison, 1969.

The purpose of this study was to determine the effectiveness of direct mail in improving Tennessee woodland owners' knowledge about economic use of their woodlands. A survey of 68 owners was made to determine their levels of technical forestry knowledge. Half were then mailed a series of 12 information sheets on forestry and all 68 were re-surveyed to determine if technical knowledge had improved. The experimental group did not change its level of knowledge significantly while the control group did. Owners who made significant gains from the direct mail service had yearly incomes less then $4000, perceived lack of forestry knowledge as a problem, derived their entire livelihood from their farms, or had not travelled outside the county for information. It was concluded that low income people will respond favorably, individuals do pay attention to mail received in an impersonal envelope and a pre-mail survey to determine interest and knowledge in the subject (1) creates interest in the subject, (2) provides the educator with knowledge of language use, cultural traits, and attitudes toward the subject, and (3) provides the educator with precise knowledge about his subjects' technical knowledge.

Hunt, John D., and Brown, Perry J., "Who Can Read Our Writing?" Journal of Environmental Education, 2(4):27-29, Summer, 1971.

This research probed the readability and general interest levels of various public information bulletins dealing with the environment. Six publications each from the U.S. Forest Service, National Park Service, and Bureau of Land Management were selected and graded according to the Flesch Reading Ease Score and the Flesch Human Interest Score. A table was generated and three averages calculated--one for each agency's publications. Reading ease of these publications is generally difficult and of poor human interest quality. Thirteen of the 18 publications examined rated "dull." The implication is that information literature must become more exciting and stimulating if it seeks to further the development of an environmental consciousness in the American public.

Kasmar, Joyce V., "The Development of a Usable Lexicon of Environmental Descriptors," Environment and Behavior, 2(2):153-160, 1970.

A lexicon of environmentally descriptive terms was produced. These terms are appropriate and clear in meaning and can be used by laymen to describe and distinguish among environments. To produce the lexicon, college students and architecture professionals first supplied adjectives specifically descriptive of architectural spaces. These terms, in bipolar form (e.g., "gay-dreary"), were rated for general appropriateness by a set of college students, and by another group of subjects for appropriateness in the description of 6 specific environments. The study produced 66 adjective pairs which were agreed upon as adequately describing the subjects' responses to test environments.

Larson, Mark A., "Content Analysis of Magazine Environmental Coverage Before and After Earth Day, April 22, 1970," unpublished M.S. thesis, University of Wisconsin-Madison, 1971.

Samples of 20 magazines published from December, 1969, to August, 1970, chosen for their originality of material, mass medium exposure and aim of environmental awareness, were surveyed for environmental coverage. Research questions were: (1) How much environmentally-related coverage appeared in advertisements, articles and cartoons and was coverage a "fad" relative to Earth Day? (2) Who were the authors and what were the sources of fact and opinions? (3) Were remedies to environmental problems recommended? What were they? (4) Did racial minority groups appear to be active in the environmental movement? A total of 396 articles were discovered: 35% published from December, 1969, to February, 1970, 35% from March-May, 1970, and 30% from June-August, 1970. No fad coverage was revealed; several magazines had "one-shot" things; the author frequency was inconclusive; 69% of the articles recommended solutions; no racial minority activity was evident. Environmentally-related advertisements showed a 100% increase from December, 1969, to February, 1970, as compared to June-August, 1970, but cartoon frequencies did not vary. A high correlation existed between environmental articles and advertisements appearing in the same magazines.

Mahaffey, Ben D., "Effectiveness and Preference for Selected Interpretive Media," Journal of Environmental Education, 1(4):125-128, Summer, 1972.

This research tested the effectiveness of audio-visual media used for historical interpretation at parks, determined which medium is most effective for users with certain socioeconomic characteristics, and compared user's preference for media along with the relative effectiveness. At a 9-stop self-guiding tour of Fort Parker State Historic Site, near Groesbeck, Texas, 622 visitors were given a leaflet and brief instructions concerning the tour. They received three exposures each to leaflets, signs, and recorded messages during their tours. Upon completion, they provided information on socio-economic characteristics, preferences for media, and information retained. The results were: 1) media preferences and information retained from each media type were in the same order: recorded messages, then signs, and leaflets last; 2) males, due possible to background, retained slightly more than females from all media; 3) college graduates, professionals, $8-12,000 income group and 21-30 age group retained the most; and 4) most respondents wished to receive all the messages, and followed the tour in order.

Marler, Lela, "A Study of Anti-Litter Messages," Journal of Environmental Education, 3(1):52-53, Fall, 1971.

This study compared the effectiveness of three approaches towards public education on litter control: promise of reward, threat of punishment, and factual presentation. Leaflets were distributed to all campers in the Uinta National Forest (Utah) during a two week period. Each leaflet was identical in layout and information presented. The only variable was the approach taken to the facts, as stated above. Factual retention was later measured by means of a questionnaire; behavior was measured by inspecting each site before and after each group and rating the amount of litter in it. For analysis purposes, the factual knowledge questionnaires were divided into

four groups: those completed by people receiving the promise of reward leaflet; those receiving the threat of punishment leaflet; those receiving the presentation of facts leaflet; and those not receiving a leaflet. The results were several: As a means of conveying a message, the leaflet was read by only a third of the entire population. Its role in information acquisition is doubtful, since more members of the control group correctly answered the factual questionnaire. More members of the group receiving the punishment orientation left their campsight as clean, or cleaner, than they had found it. The author concludes the net gain in an informed public and in decreased litter is not great enough to warrant leaflet distribution.

Morrow, Anne Cracker, "Birth Control and Publicity: A survey of the Periodical Coverage of the Birth Control Movement in the United States in the Twentieth Century," Journalism Abstracts, 8:95-96, 1970.

Ths history of the birth control movement in the twentieth century and its corresponding coverage by popular periodicals is traced. Harper's Weekly in 1915 was the first nationally circulated periodical to give substantial coverage to the movement. Coverage increased in the '30's when the depression made family limitation imperative. The emergence of the Planned Parenthood Federation (formerly, the American Birth Control League) in the 1940's signaled the respectability of the movement and coverage decreased. After 1960, overpopulation and the "pill" were two newsworthy issues causing an increase in periodical coverage. The author concludes that the media, in general, reported events considered newsworthy in the birth control movement but did little to promote it. In contrast, scientific publications tended to advocate birth control.

Sanders, Donna Hurd, "State Conservation Magazines, 1964 and 1969," unpublished M.S. thesis, University of Wisconsin-Madison.

This study compared the characteristics of conservation magazines in 1964 and 1969, specifically (1) their growth or decline status within this period, (2) their subject categories, and (3) their orientation toward youth and women. Forty conservation magazines were surveyed. Content analyses of 307 magazines (1964) and 314 magazines (1969) provided the following: great variety exists in size, layout, cost, and subscription size; all grew in budget and press run; changes in staff size, issues per year, pages per issue in the '64-'69 period were toward growth; stories fell into 22 content categories with little change in emphasis '64-'69; largest increase was 2.4% (natural history) and largest decrease was 2.9% (fish); little orientation to youth or women was evident.

Smith, W. A., "Reaching Urban Audiences," Journal of Forestry, 69(6):343-345, June, 1971.

In 1968, the Texas Agricultural Extension Service held a series of "awareness" meetings for urban timber growers to acquaint them with methods of increasing productivity. To evaluate these meetings, questionnaires were sent to those timberland owners attending, to determine the felt necessity and productivity of the series. The questionnaire format was multiple choice;

respondents chose answers most applicable to their situations. The collected data produced two conclusions: 80% of the respondents learned of the meetings via newspaper and radio medias; 98% felt further conferences would be fruitful. As a result, subsequent short courses have been conducted in Houston and Dallas.

Vogt, William M., "Wisconsin Newspaper Editors' Handling and Use of Environmental News from the State Department of Natural Resources (DNR)," unpublished M.S. thesis, University of Wisconsin-Madison, 1972.

A survey of important sources of environmental news among 121 editors (30 from daily newspapers, 91 from weeklies), representing 116 papers, reveals the Wisconsin Department of Natural Resources is the most important source. Some 3,000 clippings from the Wisconsin Press Association yielded 775 instances of DNR releases appearing in print (a use rate of 51%). Data indicated that the editors would prefer to receive more localized material in short releases. Recreation was the most frequent single catagory among DNR releases printed by Wisconsin newspapers, and is the type of news editors prefer to receive. Vogt suggests DNR establish a specialized communications section strongly oriented toward the agency's environmental protection function, and utilize a variety of channels to establish meaningful dialogue with interested persons and agencies.

Witt, William, "Multivariate Analysis of News Flow in a Conservation Issue," Journalism Quarterly, 49(1):91-97, 1972.

This study, based on the general tendency of community news flow to be associated with local conditions and activities, tested two hypotheses: (1) a greater amount of news concerning the adoption of shoreload regulations in Wisconsin counties will be found where the proposal was closer to enactment, and (2) news flow, county participation in regional planning and degree of shoreland development will comprise a system significantly related to activity surrounding the issue. Since participation in regional planning tended to inhibit community change, and high development density indicated vested interests retarding regulation adoption, communities possessing these factors would tend to manifest little activity toward enacting shoreland regulations. The multivariate analysis of the variables revealed that county progress toward adoption is positively associated with news flow and negatively related to the other two factors. Witt also notes that communities prefer "selective exposure," a desire for favorable news.

B-2. Case Studies: Decision-Making

These reports focus on case studies of factors influencing the environmental change process in specific communities.

Borton, Thomas F., and Warner, Katherine P., "Involving Citizens in Water Resources Planning: The Communication-Participation Experiment in the Susquehanna River Basin," Environment and Behavior, 3(3):284-306, 1971.

This article reports the study of a project designed to improve communication between the public and government agencies involved in the Susquehanna River Basin water resources planning. The project dealt with the problems of 1) public failure to view the management of water resources as a salient issue; 2) public responses emanating only from vested interest groups. Agency planning proposals were mailed to water resource "opinion leaders," workshop meetings were held between opinion leaders and agency staff, and public forums were held to disseminate planning information throughout the public. Evaluation procedures included before and after personal interviews and questionnaire contacts with all participants. It was found that opinion leaders' primary source of information shifted from personal experience to contact with professionals; all participants cited interpersonal interaction as the most effective means of information dissemination (brochures, public hearings, etc., rated low); a wide discrepancy between professional's priority rankings of water problems and their perceptions of public rankings and actual public rankings was revealed and corrected.

Fellman, Gordon, and Brandt, Barbara, "A Neighborhood a Highway Would Destroy," Environment and Behavior, 2(3):281-302, 1970.

This study explored residents' reaction toward a proposed highway which would destroy their working class neighborhood. Surveys and interviews investigated the meaning of the neighborhood and the meaning of displacement to inhabitants. One-quarter of the residents, the young, unattached and with mobile orientation, are indifferent toward moving; the majority (about two-thirds) place a high emotional value on the familiarity of the neighborhood elements; they are highly satisfied with shopping and educational conveniences and have relatives in proximity, have mutual interdependencies with neighbors, engage in "home-oriented" activities and have invested a large amount of personal effort and expense in home maintenance. Negative attitudes toward displacement are the result of fear of losing the aforementioned familiar life style; loss of home improvement investments, probable replacement in low-income, high-rise, public housing which has negative connotations. The authors conclude that the low esteem of urban renewal experts and city planners hold for working-class neighborhoods is unwarranted.

Fellman, Gordon, and Drandt, Barbara, "Working-Class Protest Against an Urban Highway: Some Meanings, Limits, and Problems," Environment and Behavior, 3(1) 61-79, 1971.

Historical study of citizens' reactions to federally proposed highway requiring the destruction of their community in the Brookline-Elm area of Boston, Massachusetts. Researchers posed the question, "When a citizen's wish to affect government action collides with his conviction that he is politically impotent, what happens?" Citizen responses were classified as "non-action" and "protest." Non-action included: (a) repression of facts; (b) falsification of memory and increased activity in non-critical community affairs; (c) surrender to the belief that one does not have or should not seek political influence; (d) ritual acceptance of rhetoric of democratic participation and control; (e) avoidance of the sources of public statement of discontent and these statements as such; (f) generally increased life activity in general (television watching, work, etc.). Active citizens used protest as a means to relieve anxieties, rather than effect change. Community meetings repeatedly functioned only as letter writing campaigns, and outlets for expressions of anger and frustration. In essence, public meetings were rituals to reinforce belief in democratic participation without engaging in it.

Haas, J. Eugene, Boggs, Keith S., and Bonner, E.J., "Weather Modification and the Decision Process," Environment and Behavior, 3(2):179-189, 1971.

This study measured public attitudes concerning weather modification experiments in rural areas of three states: western New York, Montana and Utah. Area residents were interviewed to elicit their views on weather modification experiments both in the local area and generally. Personal demographic characteristics were also obtained. Interviews conducted before, during and after weather modification experiments in 1968 revealed those living in communities directly affected by modification and those residing elsewhere were not different in their acceptance of the experiments. Throughout the experimental season acceptance levels increased. The experiments were better received by persons in professional and managerial occupations, the young, those better-educated, and persons active in local political offices. Less acceptance occurred when modification was perceived as a continuing operation rather than an experimental program. A high percentage of citizens thought that area residents should have the most influence in deciding whether experiments should occur, but conceded that professionals, scientists and government officials would make the final decision.

Karbon, Jerry, "Collection and Use of Information by Two Wisconsin Municipalities in Planning Sewage System Modification," unpublished M.S. thesis, University of Wisconsin-Madison, 1971.

This case study explains the collection and use of information by two Wisconsin municipalities (Sun Prairie and Two Rivers) in planning sewage system modification. City officials involved in water pollution control were interviewed to determine how, where, and through what channels they acquired information and applied its content; state and regional officials were interviewed about the function of their agencies; and the heads of newspapers and Chambers of Commerce were interviewed to determine the role of their organizations in communications about sewage treatment. Data were collected on

(1) planning; (2) financing; and (3) coordinating these processes among different levels of government and agencies. Communications about water quality standards, technology and finance reflect the authority structure of their functions; communications between state and local units are not subject to local control; local authorities delegate these often complex communications to specialists and technicians. The role of communications in local sewage treatment decisions does not appear to be the creation of alternative solutions which might be chosen but rather the provision of reports which (a) confirm higher authority decisions and (b) dictate procedures for securing specialist involvement.

O'Riordon, Timothy, "Public Opinion and Environmental Quality: A Reappraisal," Environment and Behavior, 3(2):191-214, 1971.

A case study of two communities in British Columbia which found a solution to a mutual sewage treatment problem focuses on the issue of environmental quality and public opinion. Questions such as: (1) To what extent should public opinion influence technical judgements; (2) To what extent is public opinion competent to make judgements, are explored. The public-professional-governmental decision-making process is used as a "schematic representation of political conflict over environmental quality issues." Among other things, the research indicated "public interest" is the residue of conflict over resources rather than a manifestation of public policy; a silent public is not necessarily indifferent, but may be uninformed or one that doubts political efficacy; compromises among advocate groups often lead to desirable rather than optimal decisions. The article contains a good bibliography in public opinion and the environment.

Perry, Bradford George, "A Study of Selected Factors Associated With Environmental Attitudes of Big Stone Lake Area Residents," Dissertation Abstracts, 33(3):1241-A, 1972.

A study of Big Stone Lake area residents was accomplished to aid in determining the following: (1) The existing attitudinal orientations of area residents relative to an incoming electrical generating facility; (2) The degree of associati n between selected variables and respondents' environmental attitudes. The unit of analysis consisted of Big Stone Lake area residents within a three county universe of discourse. A stratified-random sampling method was used. The interview schedule included personal, social, and economic characteristics of individuals in the sampling frame. Through the use of a Likert-type summated rating scale, the degree of attitudinal favorability toward a thirty-five point response set was calculated. The following were considered as independent variables of the study: level of knowledge; organizational participation; length of residence; education; age; sex; community identification; family size; and level of living. Major findings included:

1. Most respondents appeared to view the incoming industry as a decided economic advantage to the immediate area.
2. Of the ten independent variables hypothesized in set relationship to environmental attitude, three achieved significance at the chosen level of significance. They were: level of knowledge; organizational participation; and length of residence.

3. Through statistical analysis, it appears that level of knowledge, rate of organizational participation, and length of residence may serve as possible sources of attitudinal orientation.

Stamm, Keith R., "Communication During an Environmental Decision," Journal of Environmental Education, 3(3):49-55, Spring, 1972.

This study evaluated the effectiveness of communication occurring during a community decision-making process in Northeastern North Dakota. Communications definitions employed included awareness of the proposed project, exposure to various sources of information about the project, project relevance, and understanding among concerned parties. Two hundred sixty-two persons from several discrete populations within an area affected by two alternative flood control projects were interviewed in a door-to-door survey. Results indicate that although the project awareness level was considerable, this awareness was basically restricted to expected benefits, potential disadvantages being unconsidered. This indicates insufficient exchange of information concerning probable harm from the project. The author concludes that, currently, the public hears only the governmental agency's point of view, which seldom includes foreseeable negative repercussions. This cannot be tolerated when the changes undertaken have such far-reaching effects on the environmental quality of life.

Tolstad, John W., "Communications in Shoreland Zoning and Land Use Planning in Northern Wisconsin," unpublished M.S. thesis, University of Wisconsin-Madison, 1969.

This case study traces the process of designing a shoreland zoning ordinance for Marinette County, and focuses on the activities of Marinette County agricultural agent, Harold King (from initial contacts with university experts to use of communication channels for eliciting public reactions). Substantial reactions came from those people most affected by the proposed ordinance. Although initial identification of the problem requiring the ordinance originated at the University of Wisconsin, local citizen involvement was eventually attained through communication efforts.

Witt, William E., "A Communications Approach to the Study of a Natural Resources Issue: Shoreland Zoning in Wisconsin Counties," unpublished Ph.D. thesis, University of Wisconsin-Madison, 1970.

This study attempted to describe a natural resources issue in its complexity, and then quantify some of the interrelated variables. In an effort to preserve and enhance its water quality, the State of Wisconsin enacted the Water Resources Act of 1965. The Act was signed into law in August 1966. An attempt was made to describe the operation of the new law with respect to the several levels of government involved, and to analyze factors relevant to adoption of county shoreland ordinances in compliance with the law. The levels were the state, regions, and counties. Their roles were examined and described through interviews in a dozen counties with officials representing all levels. Factors for analysis were (1) cottage and home development in shoreland, (2) county membership in regional planning commissions, and (3) flow of shoreland news from the state into counties via daily newspapers.

The association of these three factors with progress in shoreland zoning was measured by multiple regression and correlation. It was found that all three factors acting together explained about 57% of the variance in shoreland zoning (significant beyond p .01), and that each variable acting separately showed significant relationships in predicted directions with progress (shoreland development beyond p .05; news flow and membership beyond p .01).

B-3. Knowledge, Attitudes and Behaviors

These research reports focus on the environmental knowledge, attitudes, and behaviors of the general public and specify community sub-groups.

Allen, George H., "How Deep Is Environmental Awareness?" Journal of Environmental Education, 3(4):1-3, Summer, 1972.

The impact of Environmental Week and Earth Day (1970) activities, (including an Earth Fair) was assessed in Humboldt County, California through a series of personal interviews. Interview participants were classified according to education, presumed socioeconomic level, and age, and interviews included (non-incorporated residential areas, suburban residential areas, and city residential areas). Of the 173 households approached, 148 (86%) provided useable interviews on the five questions asked. Three of these questions were analyzed in this report. Findings include (1) college-oriented population had the greatest awareness of the environmental activities, (2) in non-college oriented areas the least awareness was found among the lowest and highest economic levels, (3) seventy-three percent of the respondents were aware of Environmental Week, (4) sixty-five percent of the Earth Fair, (5) while 13% attended the Fair. The author noted that "Conservation" is an upper-middle class social movement that is especially weak in rural areas where people exploit land and water resources. The local area, populated by people in exploitive industry, had little concern for environmental problems. Thus, environmental activities were mainly supported by young people, enthusiasm being generated through contacts within the county's educational system.

Bailey, George Arthur, "The Public, the Media, and the Knowledge Gap," Journal of Environmental Education, 2(4):3-8, Summer, 1971.

Information diffusion concerning Earth Day, 1970, was statistically analyzed to determine the media's effect upon the public. Two identical phone surveys, before and after, were made of two independent random samples in Madison, Wisconsin. The survey questionnaire measured four basic kinds of variables: (1) level of information gained about E-Day; (2) demographics; (3) political activism; and (4) information sources. Results indicated that publicity did raise the level of public information about E-Day but information about E-Day varied with age, the most informed being the teen-agers, the least informed being the "golden-agers." Education was strongly related to information, as was occupational class. Political and social activists were likely to become informed about E-Day. Diffusion of information occurred primarily through newspapers, secondarily through interpersonal channels.

The author concludes that E-Day was a failure for those who envision change as a result of mass movement and a success for those who see change as a result of agitation by an elite sector of the public.

Barnett, Larry D., "Concern With Environmental Deterioration and Attitudes Toward Population Limitation," Bioscience, 20(18):999-1002, September, 1970.

The purpose of study was to determine the link between the level of concern for environmental degradation and the favorability of attitudes toward population control. Data came from a national public opinion poll conducted for the National Wildlife Federation (January, 1969) by the Gallup Organization. Two questions were asked of 1503 adults 21 years of age and older: (1) "How concerned are you about the spoilation of our natural surroundings?" and (2) "Do you think it will be necessary at some time to limit our population in order to maintain our standard of living?" Sample variables, such as section of country, education, occupation, income, race, sex, and population of area of residence were controlled. Using the 0.10 significance level (Chi-square) as maximum for rejecting the null hypothesis, relationships between environmental concern and population limitation attitude persisted regardless of age, section of country, and among the following persons: high school graduates, members of households whose head is a clerical, sales, or skilled worker, blacks, males and residents of communities of 2500-9999 population. Since no variable was able to totally eliminate relationships between environmental concern and population limitation, there must be some intrinsic link. The relationship is not a strong one. An intensive educational campaign is necessary to show the public that there is a relationship between population and pollution.

Chaney, Ed, "The Environment: Who Cares? Why? So What?", Journal of Environmental Education, 1(3):80-82, Spring, 1970.

This article reviews the public's attitudes about the environment. Two national opinion polls sponsored by the National Wildlife Federation during January and July of 1969 provide interpretive data. Gallup found that: 1) 85% of public is concerned with the state of the environment; 2) 72% were willing to pay $10 more in taxes to improve conditions; 3) air and water pollution were thought to be the most pressing problems; and 4) people were evenly split on the necessity of limiting human population. The later poll dealt with more specific issues, and found that: 1) 52% of people felt that natural environment receives too little government attention and financial support; 2) 68% said air and water pollution have not affected their personal enjoyment of surroundings; 3) 77% would not be willing to pay a $2 monthly increase in electric bill to stop power plant pollution; and 4) the affluent, educated, suburban, younger adult and late adolescent public segments are environment's greatest proponents. Implication is that public concern is not intense enough to drive them to make personal sacrifices to save the natural environment.

Clark, Wilson F., "Implementing Environmental Policy," Journal of Environmental Education, 3(3):8-13, Spring, 1972.

Clark attempts to learn the views of Bureau of Land Management personnel regarding their felt responsibility and relationship to the public through a 1970 survey concentrating on 186 Bureau employees. The survey was not a statistical sampling and analyses, but rather a loose opinion poll using open-ended questions. Conclusions drawn from 90 completed questionnaires include: (1) BLM people have a fairly broad concept of conservation, but some still have a limited view of resource management ('broad' and 'limited' are undefined); (2) 65% of the respondents had no or a narrow view of their role as an educator of the public; (3) many BLM people do see their contacts with the public as possible educational opportunities, but many do not.

Devall, W.B.,"Conservation: An Upper-Middle Class Social Movement: A Replication," Journal of Leisure Research, 2(2):123-126, 1970.

This study applies the findings of Harry, Gale and Hendee (Journal of Leisure Research, 1(3):255-261, 1969) to analysis. Using mailed questionnaires, the data support Harry's conclusion that conservation preservation organizations draw members from the upper-middle class. Active members of the Sierra Club also tend to be active in other conservation organizations. Conservationists tend to first join the Sierra Club, then other conservation clubs. Contrary to Harry's findings, Sierra Club members were no less likely to belong to other kinds of voluntary organizations than respondents in a nationwide sample survey. (Harry found that conservationists tended to specialize, i.e., join conservation clubs only).

Eisele, Tim, "Wisconsin Waterfowl Hunter Attitudes on Regulations and Management Policies," unpublished M.S. thesis, University of Wisconsin-Madison, 1970.

This study was designed to characterize the Wisconsin duck hunter: his knowledge, attitudes, and communication activities regarding waterfowl hunting. Through random sampling and mailed questionnaires, 442 responses to a "true-false" test consisting of statements concerning waterfowl management and factors influencing waterfowl hunting were obtained. The hunters were against regulations that do not differentiate between species: but were in favor of species oriented regulations, the goose tagging program in Wisconsin, and extra hunting days rather than increased bag limit. Hunters' sources of information were magazines and the Department of Natural Resources. They tended not to know if a writer's background was in conservation nor did they consider any one source more objective than the other. A coorientation experiment revealed that the DNR knew hunter's attitudes more accurately than hunters knew the DNR's and that both groups considered their views closer to the others' than they actually were.

Erickson, David L., "Attitudes and Communications about Wildlife," Journal of Environmental Education, 2(4):17-20, Summer, 1971.

The research investigated attitudes regarding wildlife, and produced hypotheses regarding the relationship between people and their wildlife attitudes. Q-methodology was employed, using self-referent statements sorted along a continuum from "agree" to "disagree". Forty-nine people were chosen according to a factorial design consisting of four levels--hunters, watchers, farmers, and other. Results include: (1) Protectionists (those in favor of saving vanishing wildlife) are more apt to be "watchers" than hunters; (2) Reductionists (those in favor of hunting and control of destructive wildlife) are apt to be farmers. The study supported the importance of assessing wildlife attitudes: (1) They enable communicators to predetermine the type of message that would appeal to an audience; (2) They help identify gaps in public understanding; (3) They are useful in designing mass media messages.

Erickson, David L., "Attitudes and Communications About Wildlife," North American Wildlife and Natural Resources Conference - 35th Conference, March 22-25, 1970, pps. 372-383.

The purpose of the research was two fold: (1) to determine some attitude types concerning wildlife and its management, and (2) to suggest hypotheses about the relationship between wildlife attitudinal types and selected demographic and other characteristics. Q-methodology statements were developed by: (1) taped exploratory interviews from a variety of people concerning their opinions on wildlife; (2) grouping similar ideas together; according to the concepts of scarcity, image and management of animals; and (3) checking reliability of composed statements by having persons sort them according to idea groups. This process produced eighty self-referent statements which were presented to 49 persons, chosen according to wildlife orientation and sex, in one hour interviews. Data was intercorrelated and factor analyzed to identify patterns of similarity. Factor strength was also determined. The findings indicated nine wildlife attitudinal types, the most evident and stable being "protectionists" (who wished to protect endangered species from hunting and provide sanctuaries) and "reductionists" (who viewed many species as destructive to crops and livestock and favored continued efforts at their reduction). Most of the people sampled were classified as "protectionist". This specific study, the techniques it uses, could be employed in the design of educationally effective conservation programs. Q-methodology can provide useful information in communication design and management.

Evrard, James O., "Testing and Teaching Waterfowl Identification," Journal of Environmental Education, 1(4):119-120, Summer, 1970.

Evrard examines the identification abilities of duck hunters to see if these abilities can be improved by training. Of 96 Wisconsin hunters contacted, 20 experienced hunters (29 years, 27 ducks annually) and 20 novice hunters (5 years, 2 ducks annually) were field tested on ability to identify waterfowl from a simulated blind in Madison. In Horicon, Wisconsin, hunters of equal experience and skill were similarly field tested, but 24 of the 33 first underwent three training sessions viewing identification films and slides. The study implies that identification abilities can be improved with a testing program set-up to determine hunters qualified for selective shooting. Training programs should be available for those needing improvement.

Gerlach, Luther P. and Hine, Virginia, "Many Concerned, Few Committed," Natural History, 79(10):16-17, 76-80, December, 1970.

Results of a survey of more than 7,000 Natural History readers are reported. The October, 1970, issue provided a preliminary report and details on questionnaire construction. The sample was divided in several different ways: on age, sex, occupation, and participation in environmental groups. Findings include: Generally, younger people (under 30), women over 30, and men over 30 in the professions, education, and social services tend to diverge from conventional attitudes and basic assumptions common in our society. Men over 30 and in other occupations hold more conventional attitudes and beliefs. Conservation minded people showed least divergence in such issues as population control, personal responsibility for pollution, faith in technology. Eighty-one percent disagreed with the statement that plants and animals exist primarily for man's use and enjoyment. Of all respondents to the survey 50% of the group felt wild animals have equal rights with man, 45% felt animal rights subordinate to man. People under 30 tend to hold the equal rights with man view most strongly. Natural History readers are not dedicated churchgoers. Seventy-one percent agreed with the statement that American beliefs and values are a basic cause of our environmental problems. Those under 30 question basic values most. The assumption that economic growth is generally good for any community was rejected by 63%. The profit motive in general was viewed as outdated by 63% of those under 30, 61% of women over 30, 50% of men in the professions, 42% of men in government, 40% of men in business, and 36% of men in engineering. Other results are reported.

Hall, M. Francoise, "Male Attitudes to Family Planning Education in Santiago, Chile," Journal of Biosocial Science, 3(4):403-416, 1971.

Chilean males attitudes toward contraception was surveyed. Confidential interviews were conducted with a selected sample of men representing upper, middle and lower socio-economic levels in urban Santiago (720) and the rural area nearby (240). The results indicated that men, in general, were in favor of family planning in personal relationships and for other adults. They favored giving contraceptive information to men rather than women, especially in the rural, lower-economic group. They favored contraceptive information for youths of both sexes and as part of the formal education process according to age of school children. Hall concludes that men want and should be included in family planning decisions and should be targets of planning education programs. Such programs should include adolescents and be integrated into school systems.

Harry, Joseph, Gale, Richard, and Hendee, John, "Conservation: An Upper-Middle Class Social Movement," Journal of Leisure Research, 1(3):246-254, 1969.

The study attempted to discover whether conservation members differed from non-conservation members in concentrating their club participation in a conservation group, or in having special social characteristics. Through questionnaires administered to the membership of a large U.S. recreation club and a review of club files, the researchers found that individuals claiming membership in a conservation association tended to be older, better-educated and in higher-status occupations than new conservationists. Conservationists

were more involved in the formal structure of the organization including those committees influencing government legislation of resources. Conservationists also specialized in other clubs they were affiliated with (conservation and outdoor activity groups). The researchers note that conservationists' failure to belong to other civic, social or political groups hampers "dissemination" of their environmental concern.

Hendee, John C. and Harris, Robert W., "Forestry Perception of Wilderness User Attitudes and Preferences," Journal of Forestry, 68(12):759-762, December, 1970.

The degree to which foresters correctly perceive felt needs and attitudes of their clientele was studied using a questionnaire mailed to a sample of 2000 visitors of three wilderness areas. The 1350 respondents indicated their agreement with statements in each of three questionnaire sections: an attitude component of 60 items measuring whether the respondent was primarily "wilderness purist" or "development-oriented", a list of 53 statements suggesting policy alternatives, and a list of 22 conceivable rules for wilderness users. Fifty-six forest managers were given the same attitude scale to determine their personal views, and were then asked to hypothesize how they felt most wilderness users would respond to each statement on the questionnaire about wilderness policy and rules. Results indicated that both foresters' and users' attitudes towards wilderness were primarily "purist." Foresters also had accurate perceptions of users' reactions to two-thirds of the suggested management policies and rules. Yet their perceptions were inaccurate in several ways: They overestimated users' resistance to rules as well as their support for development; they felt users had more definite opinions regarding specific issues than was demonstrated. Their misconceptions of users' opinions suggest lack of contact and communication with typical wilderness users. Channels of communication must be opened to improve managers' perceptions of the views of their clientele.

Jones, Richard W., "Forestry's Changing Ecology," Journal of Environmental Education, 2(2):29-31, Winter, 1970.

Jones examines the changes that have occurred in America's attitude and use of the nation's forests and the accompanying stance and qualifications of the champions of wilderness preservation from the time of initial settlement to today. This analysis leads to the development of a dynamic, present-day definition of forestry, to describe how "forestry is changing from a production to a consumption orientation." The major emphasis of this definition (protection, management, and utilization) reveals the requirements of today's forest resource managers, and their function: "to optimize human benefits from forest resources through (1) comprehension of the forest environment; (2) application of professional skills; and (3) interpretation of the philosophy, goals, and techniques of forest resource management.

Lingwood, David A., "Environmental Education Through Information Seeking: The Case of an Environmental Teach-In," Environment and Behavior, 3(3): 230-262, 1971.

This study assessed the changes in environmental knowledge and opinions of University of Michigan students as a result of the March, 1970, Teach-in. Surveys taken in December, 1969, and May, 1970, measured the general student populations' patterns of media use, extent of interpersonal communication regarding social issues, news knowledge and interest (including environmental topics), and environmental opinions. The May survey also asked whether respondents attended the Teach-in, and requested their perceptions of personal information changes, opinion and behavior. A survey of people attending the Teach-in probed reasons for attending and general expectations for it; questions from the general survey were repeated. Results of the Teach-in survey showed participants learned from Teach-in primarily through interpersonal means, had a basic knowledge of environmental problems before the Teach-in, and ordinarily rely heavily on print media for environmental information. Forty percent felt they learned nothing to change their behavior. Comparison of the two general surveys indicated no significant change except for indicating that effects of Teach-in (in terms of increased knowledge and attitude change) was publicity focus for transferring information to the public-at-large.

Madigan, Dennis P., "New Publics in the Spectrum of a Conservation Agency," Journal of Environmental Education, 2(1):24-25, Fall, 1970.

A survey in Wisconsin determined if conservation information is reaching all audiences and what is being done with that information. Three groups represented differing levels of environmental awareness: (1) a panel of University of Wisconsin experts on conservation; (2) a sample of conservation-oriented Wisconsin organizations; (3) a sample of organizations not apparently concerned with conservation issues. An investigation of the knowledge of the economic, ecological, and political factors and attitudes towards issues in terms of support produced these findings: (1) non-conservation organizations, while aware of the importance of conservation issues, avoid involvement because they fail to see the relevance to their group's goals and interest; (2) the more complex and specialized a conservation issue, the more likely groups lacking ecological backgrounds employ a standard economic analysis; and (3) conservation groups fail to evaluate new proposals based on past experience. The author implies that environmental propagandists must devise educational programs specifically targeted to certain non-conservation groups.

Mashaw, Lane H., "Public Relations - A Self-Analysis," Journal: Water Pollution Control Federation, 42(3):354-360, 1970.

This study assessed waste water treatment facility operators' image of themselves, their jobs and their public. The questionnaire survey was sent to 450 Iowan operators and a 40% (181) response was obtained. Responses indicated that superiors do not encourage operators' attendance at city council meetings, do not inform the public of the operators' function nor encourage his recognition by the public. The operators tend to be highly satisfied with their jobs although they believe it ranks low in public esteem. They respond eagerly and informatively to citizen inquiries but rarely take the initiative to address community groups. In general, the smaller the community, the greater the operator interaction with the public.

Mitchell, Bruce, "Behavioral Aspects of Water Management: A Paradigm and a Case Study," Environment and Behavior, 3(2):135-153, 1971.

This case study was conducted to relate the environmental perceptions, attitudes and behavio. of individuals to the environmental perceptions, etc., of management and other environmental decision-making organizations. Management professionals and a sampling of the population from urban-rural, and rural sections of Southwestern Ontario were asked to identify and rank water resource problems in their area. Findings revealed that: (1) professionals and the public had significantly different interpretations of water problems; (2) the difference in resident subgroupings (urban, urban-rural, rural) did not influence the common perception of problems; (3) the public expressed a continuum rather than a polarization of attitudes on water problems. It was concluded that professionals should gauge public attitude in order to formulate policies which will not provoke public opposition and generalizations about the public's cognitive, affective and behavioral levels are possible. Further research is suggested to examine possible effects of other subgrouping such as age and sex.

Moore, Judith Hoffman, "Defining and Interpreting Ecology," Journal of Environmental Education, 3(1):54-55, Fall, 1971.

Those concepts necessary for an understanding of ecology, and the degree to which the concepts are understood in two groups is reported. Ten "vital" concepts (such as biotic pyramid, evolution, population niche, and species distribution) were determined through interviews with seven "theoretical ecologists" who illustrated each concept with a current environmental situation. Based on these illustrated concepts, a multiple-choice test was constructed for two groups: a high school biology class and the Madison Area League of Women Voters. The respondents were to select from four possible examples the one illustrating a given concept. Results indicated that those concepts dealing with evolution, population, and adaptation gave both groups the most difficulty. The League was given an additional attitude test to see if a correlation existed between ecological comprehension and a desire to reverse current environmental trends. No correlation was shown. The author concludes that a test of ecological concept understanding can alert the educator-communicator to the level of his audience. However, even such understanding does not guarantee an individual being prone to ecologically-oriented action.

Rankin, Robert E., "Air Pollution Control and Public Apathy," Journal of the Air Pollution Control Association, 19(8):565-569, 1969.

This study used a questionnaire-survey to assess public attitudes and concern about air pollution. Subjects from metropolitan (900) and rural areas (500) in and around Charleston, West Virginia, responded to questions regarding the existence of pollution in their city or town and the immediate neighborhood, ranked pollution in view of other problems such as unemployment, stated whether pollution can and will be reduced, identified possible bad effects from pollution reduction, indicated their willingness to spend money for control, identified personal attempts to affect control, and gave reasons for declining to complain. The results showed greater pollution awareness for city or town than for neighborhood; the higher the ranking of pollution the

greater the belief that it could be solved, and vice versa; favorability toward anti-pollution spending decreased as the proposed cost increased; and a widespread belief that ultimately pollution would not be reduced. In general, the public did not know how or where to complain and further believed complaints useless. The results suggest that anxiety arousal about pollution problems must be quickly followed by public information regarding solutions or a defensive avoidance posture against the problem will be taken.

Seed, Allen H. Jr., "Who Litters--And Why?", Journal of Environmental Education, 1(3):93-94, Spring, 1970.

This article deals with the problem of littering, Keep America Beautiful, Inc. (KAB) commissioned a nationwide Gallup Poll to find out "who litters and why." The results were: (1) men litter twice as much as women; (2) people between the ages of 21 and 35 litter the most; (3) big families litter more than small families; (4) small town residents are greater litterers than city and suburban dwellers; (5) most Americans of all ages agree that littering is a problem and greater enforcement is necessary; (6) admitted litterers cited personal carelessness, laziness, indifference, and lack of waste containers as reasons. Factors contributing to an increasing litter problem are increasing affluence, more travel and leisure time, more people, and increased consumer demands for convenience items. Public education, providing enough waste containers and strict enforcement of laws are the best method of attack. Individuals must consider themselves personally responsible for litter.

Sewell, W. R. Derrick, "Environmental Perceptions and Attitudes of Engineers and Public Health Officials," Environment and Behavior, 3(1):23-59, 1971.

A study was undertaken to determine how experts in environmental quality areas perceive problems and solutions in their fields. Thirty engineers specializing in water resources (1967) and forty public health officials (1969) in British Columbia were interviewed to discover what they viewed as the major problems in B.C. and how environmental quality problems ranked among these. Health officials believed environmental quality problems as major; engineers viewed social problems as major. Both groups: described problems in technical terms rather than public language; identified problems through physical measurement rather than public feedback; proposed conventional solutions to problems; saw themselves as technical advisors rather than policy makers and felt that they were the best qualified to handle problems - public opinion was not necessary. Two factors conditioning these attitudes were: (a) years in profession - the longer the years, the less the concern for environmental quality; (b) view of man's relationship to nature - the greater concern for environmental deterioration accompanied the belief that nature was in control of man; much less concern accompanied the belief that man was in control of nature. In the latter group "man" was often conceived as the expert.

Stamm, Keith R. and Bowes, John E., "Environmental Attitudes and Reaction," Journal of Environmental Education, 3(3):52-60, Spring, 1972.

This study postulates two dimensions in people's orientation towards scarcity: functional substitution--an attitude advocating replacement of scarce resources with substitutes, and reversal of trends--an attitude advocating the reversal of any trend toward scarcity. A survey was designed to test the following two hypotheses: (1) Persons scoring high on the reversal of trends attitude scale will, as contrasted with those receiving lower scores, show less support for the Army Corps of Engineers, know more disadvantages of the project, and perceive less agreement with the Corps; (2) Persons scoring high on the functional substitutes attitude scale will, as contrasted with those receiving lower scores, show greater support for the Army Corps of Engineers, know more benefits of the project, and perceive greater agreement with the Corps. Each attitude scale consisted of seven Likert items in which the respondent was to tell the degree to which he favored or opposed a hypothetical solution to the scarcity problem described in the item. Two hundred and sixty-two persons from several areas affected by two alternative flood control projects were interviewed in a door-to-door survey. Results strongly supported the validity of the functional substitutes hypothesis, yet raised questions about unilateral acceptance of the reversal of trends hypothesis.

Stamm, Keith R., "Two Orientations to the Conservation Concept of Scarcity," Journal of Environmental Education, 1(4):134-139, Summer, 1970.

The scarcity orientation of outdoor enthusiasts and the effect media have on this orientation is examined. Scarcity orientation is defined by a person's preference for reversing the trend towards scarcity of a natural resource (reversal of trends), or finding substitutes (functional equivalents). Seven current conservation problems in Wisconsin were given to adults with alternate "solutions" involving the scarcity orientation. Use of conservation media, membership in conservation clubs, and time spent in outdoor activities were variables correlated with responses. Findings include: (1) outdoor activists demonstrate a slight preference for reversal of trends; (2) hunters read more outdoor material; (3) reading outdoor magazines and especially columns results in reversal of trends orientation; and (4) participation in outdoor activities improves environmental awareness and is associated with both orientations.

Tichenor, P.J., Donohue, G.A., Olien, C.N., and Bowers, J.K., "Environment and Public Opinion," Journal of Environmental Education, 2(4):38-43, Summer, 1971.

The authors examine the difference between national consensus on the environmental issue and attitudes in economically affected communities, if adopted. Surveys were taken in three areas of controversy: along the Osseo-St. Cloud stretch of the Minnesota River (DDT issue), northeastern Minnesota, especially Duluth (steel Plant), Silver Bay (taconite), and Ely (Boundary Waters Canoe Area - mining). Questions related to the communities' environmental problems as well as those of the other communities were asked. In affected areas: (1) most thought technology would solve pollution problems; (2) attitudes were quite fixed and impervious; (3) self-interest is a

stronger determinant than socioeconomic status of environmental opinion, and is issue-specific; (4) environmental issues have potential for intense intra and inter community conflict; and (5) short-run economic aspects seem to take precedence over long-run consequences. More informed persons seemed to be more frequently opposed to restrictions, perhaps because they were usually directly affected. The implications are that general public support for environmental measures may fall off as people (a) learn more of the specific issues and (b) interpret restrictive proposals as harmful to the local community, and that to counteract this trend state leaders must be more persuasive.

Tienhoven, A. Van, Eisner, T. and Rosenblatt, F., "Education and the Population Explosion," Bioscience, 21(1):16-19, January 1, 1971.

This report presents the results of a 1969 survey designed to determine attitudes and preferences concerning family size and contraceptive technique. A questionnaire was given to 544 undergraduates (98% responded), and 653 faculty members (45% responded) at Cornell University. Participants were characterized by sex, age, marital status, academic field, and degrees confirmed. Tables were produced regarding the desired number of children, preference for different birth control measures, for limiting family size and for "spacing children", and opinions on the effects of vasectomy and cutting of oviducts. Findings included: (1) the average number of children desired was 2.9; (2) the steroid pill is the most favored contraceptive; and (3) widespread prejudice and misinformation exists about sterilization and its effects. The study implies even among more highly educated segments of our society there appears to be a lack of understanding of personal population control.

Timothy, Earl Errol, "Some Determinants of Community Attitudes Toward a Federally Sponsored Resource Development Program," Dissertation Abstracts, 31(12):6335-A, 1971.

The study explored the relationships between nine selected factors and the attitude of residents of a small, rural, isolated and economically-deprived community toward proposals for a National Park adjacent to their town. The dependent variable of the study, attitude toward the Apostle Island National Lakeshore, was operationalized by a 10-item Likert-type scale. Independent variables were of two types. Three were social psychological factors: governmental orientation, ingroup-outgroup consciousness (5-item indices), and perceived personal importance of Park objectives. The six structural variables were age, formal education, community tenure, employment status, extra-community contact, and anticipated income rise through increased tourism. The sample comprised individuals from 82 randomly selected households. All data for the study was collected by personal interview. Correlation analysis was used to test the established hypotheses. Variables that showed significant relationships to attitudes were: (1) Governmental orientation--the more the individual perceived the centralized planning role of the Federal Government as legitimate and desirable, the more favorable was his attitude toward the Park; (2) Ingroup-outgroup consciousness--the more inclined the respondent was toward social interaction with non-community persons, the more favorable was his attitude toward the Park; (3) Perceived personal importance of Park objectives--the greater the importance attached

by the respondent to the declared objectives of the Park, the more favorable attitude he held toward the plan; (4) Formal education--the higher the level of education attained, the more favorable was the individual's attitude toward the Park. Conclusions to be derived from the findings are: (1) the residents of this small, rural, and isolated community attach a great deal of significance to the political implications of socio-economic action; (2) attitudes toward the Park are conditioned to a considerable extent by the more stable attitudes towards outsiders, and by citizen assessment of the plan's potential for attending to their personal concerns.

Tognacci, Louis N., Weigel, Russell H., Wideen, Marvin R., and Vernon, David T.A., "Environmental Quality: How Universal is Public Concern?" Environment and Behavior, 4(1):73-86, 1972.

An attempt was made to decide whether environmental concern is a universal phenomenon unrelated to personal attributes or whether it is a function of specific socio-demographic variables. One hundred and thirty-one randomly selected subjects were interviewed to determine the personal value they attribute to positive environmental goals, their assessment of the country's progress toward goals, and their positions (strongly agree - strongly disagree) on issues related to five specific environmental topics, e.g., overpopulation. These findings were correlated with the subjects' socio-political orientation, economic status, level of formal education, age and sex. The environmentally concerned tended to be more liberal, younger and better-educated than the less concerned. The assumption that the ecology movement has unified diverse groups is doubtful. Personality types involved in ecology movement are those usually found in any civic, political, etc., movement.

The University of Wisconsin's intercollege Center for Environmental Communications and Education Studies helps facilitate programs focused on the development of a citizenry that is knowledgeable concerning problems that affect the environment, that understands how to be effective in helping to solve such problems, and that is motivated to work toward their solution. The Center is concerned with teaching, research, and public service activities associated with the fields of environmental interpretation, natural resource public relations, and conservation education. Public attitudes and actions are at the core of the problem of defining and maintaining environmental quality. It is the mission of the Center to help discover new and better ways of engendering public understanding and support for conservation, to help train more and better environmental communicators and educators, and to help extend to communities, schools, agencies, and organizations assistance in engendering a viable ecological conscience.